Gas Rotisserie Oven

MODEL DRG-40

Service Manual

Serial Numbers 120170 and Higher

BKI®

Fresh ideas in foodservice equipment

Warranty Information

LIMITED ONE YEAR WARRANTY

BKI (The "Company") warrants to the original purchaser that at time of shipment from the Company factory, this equipment will be free from defect in materials and workmanship. Written notice of a claim under this warranty must be received by the Company within ONE YEAR from the date of installation, but no longer than ONE YEAR AND THREE MONTHS from date of shipment from the factory. Defective conditions caused by abnormal use or misuse, lack of or improper maintenance, damage by third parties, alterations by unauthorized personnel, acts of God, failure to follow installation and/or operating instructions, or any other events beyond the reasonable control of the Company will NOT be covered under this warranty. The obligation of the Company under this warranty shall be limited to repairing or replacing (at the option of the Company) any part, with the exception of lamps, fuses, and glass (which are not covered under warranty), which is found defective in the reasonable opinion of the Company. Any part found defective by the Company will be repaired or replaced without charge F.O.B. factory, Simpsonville, South Carolina or F.O.B. authorized BKI Distributor. The Company and/or its authorized representatives will assume the normal replacement labor expense for the defective part for the period of the warranty as stated above, excluding travel and/or other expenses incidental to the replacement of the defective part, where replacement work is performed during standard business hours and not subject to overtime, holiday rates, and/or any additional fees. IN NO EVENT SHALL THE COMPANY BE LIABLE FOR LOSS OF USE, LOSS OF REVENUE OR LOSS OF PRODUCT OR PROFIT OR FOR INDIRECT OR CONSEQUENTIAL DAMAGES INCLUDING BUT NOT LIMITED TO, FOOD SPOILAGE OR PRODUCT LOSS. WARRANTY DOES NOT COVER GLASS BREAKAGE. THE ABOVE WARRANTY IS EXCLUSIVE AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARE EXCLUDED INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

REPLACEMENT PARTS

Any appliance replacement part, with the exception of lamps, fuses, and glass, which proves to be defective in material or workmanship within ninety (90) days of installation will be replaced without charge F.O.B. Factory, Simpsonville, SC or F.O.B. authorized BKI Distributor. The user shall have the responsibility and expense of removing and returning the defective part to the Company as well as the cost of reinstalling the replacement or repaired part.

NOTICE	The purchaser must post, in a prominent location, instructions to be followed in the event the user smells gas. This information shall be obtained by consulting the local gas supplier.

⚠WARNING	**FOR YOUR SAFETY** **Do not store or use gasoline or other flammable vapors or liquids in the vicinity of this or any other appliance.**

⚠WARNING	**Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operation and maintenance instructions thoroughly before installing or servicing this equipment.**

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Introduction

Your DRG-40 is a computer controlled gas fired rotisserie oven. It utilizes a double revolving rotor system to ensure even product cooking. The unit contains a single stage cook and hold computer with 5 customizable cook programs. Electrical controls are provided for powering the unit, turning on inside lights, igniting upper/lower burners, turning the rotors, filling the water bath and resetting the unit. A manual lever is supplied for draining water from the water bath. The rotor system is removable to allow for easy maintenance and cleaning.

The ***BKI*** name and trademark on this unit assures you of the finest in design and engineering -- that it has been built with care and dedication -- using the best materials available. Attention to the operating instructions regarding proper installation, operation, and maintenance will result in long lasting dependability to ensure the highest profitable return on your investment.

NOTICE PLEASE READ THIS ENTIRE MANUAL BEFORE OPERATING THE UNIT. If you have any questions, please contact your ***BKI*** Distributor. If they are unable to answer your questions, contact the ***BKI*** Technical Service Department, toll free: 1-800-927-6887. Outside the U.S., call 1-864-963-3471.

Safety Precautions

Always follow recommended safety precautions listed in this manual. Below is the safety alert symbol. When you see this symbol on your equipment, be alert to the potential for personal injury or property damage.

Safety Signs and Messages

The following Safety signs and messages are placed in this manual to provide instructions and identify specific areas where potential hazards exist and special precautions should be taken. Know and understand the meaning of these instructions, signs, and messages. Damage to the equipment, death or serious injury to you or other persons may result if these messages are not followed.

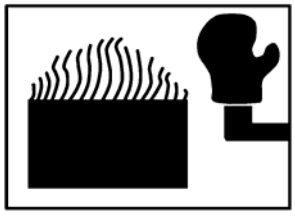
⚠DANGER This message indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING This message indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.

⚠CAUTION This message indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTICE This message is used when special information, instructions or identification are required relating to procedures, equipment, tools, capacities and other special data.

Safe Work Practices



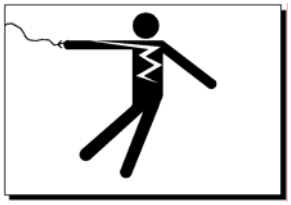
Wear Safe Clothing Appropriate To Your Job

Always wear your insulated mitts when handling hot racks or touching any hot metal surface. If you lose or damage your mitts, you can buy new ones at your local restaurant equipment supply store or from your local ***BKI*** Distributor.

Always wear non-skid shoes when working around the oven or any other equipment.

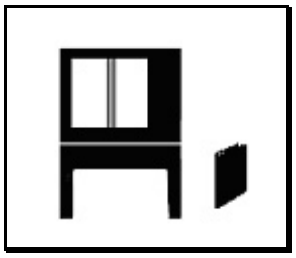
Never wear loose clothing such as neckties or scarves while operating this equipment. Keep loose hair tied back or in a hair net while operating this equipment.

Always wear appropriate personal protection equipment during the cleaning process to guard against possible injury from hot cleaning solution.



Beware of High Voltage

This equipment uses high voltage. Serious injury can occur if you or any untrained or unauthorized person installs, services, or repairs this equipment. Always Use an Authorized Service agent to Service Your Equipment.



Keep this manual with the Equipment

This manual is an important part of your equipment. Always keep it near for easy access. If you need to replace this manual, contact:

BKI
Technical Services Department
P.O. Box 80400
Simpsonville, S.C. 29680-0400
Or call toll free: 1-800-927-6887
Outside the U.S., call 864-963-3471

Protect Children

Keep children away from this equipment. Children may not understand that this equipment is dangerous for them and others.

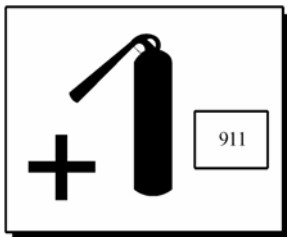
NEVER allow children to play near or operate your equipment.

Keep Safety Labels Clean and in Good Condition

Do not remove or cover any safety labels on your equipment. Keep all safety labels clean and in good condition. Replace any damaged or missing safety labels. Refer to the Safety Labels section for illustration and location of safety labels on this unit. If you need a new safety label, obtain the number of the specific label illustrated on page 6, then contact:

BKI
Technical Services Department
P.O. Box 80400
Simpsonville, S.C. 29680-0400
Or call toll free: 1-800-927-6887

Outside the U.S., call 864-963-3471

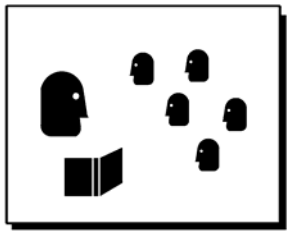


Be Prepared for Emergencies

Be prepared for fires, injuries, or other emergencies.

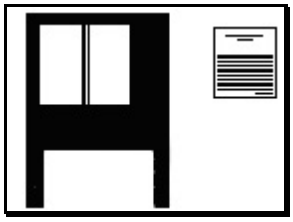
Keep a first aid kit and a fire extinguisher near the equipment. You must use a 40-pound Type BC fire extinguisher and keep it within 25 feet of your equipment.

Keep emergency numbers for doctors, ambulance services, hospitals, and the fire department near your telephone.



Know your responsibilities as an Employer

- Make certain your employees know how to operate the equipment.
- Make certain your employees are aware of the safety precautions on the equipment and in this manual.
- Make certain that you have thoroughly trained your employees about operating the equipment safely.
- Make certain the equipment is in proper working condition. If you make unauthorized modifications to the equipment, you will reduce the function and safety of the equipment.



Use Gas Safely-- Avoid Danger

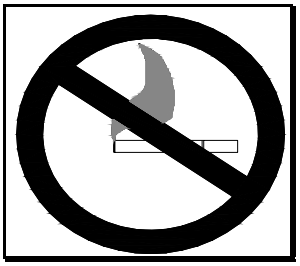
Gas can be a dangerous fuel if not handled safely.

Make sure to ventilate the oven properly. If the oven is not properly ventilated, carbon monoxide can be released around the oven. Asphyxiation or suffocation can occur if gas is not ventilated properly.

Before using this appliance for the first time, contact your local gas supplier for instructions about what to do if you smell gas. Post those instructions somewhere near the oven, so that everyone who uses or works near the oven knows what to do if they smell gas.

Clearance to Combustibles

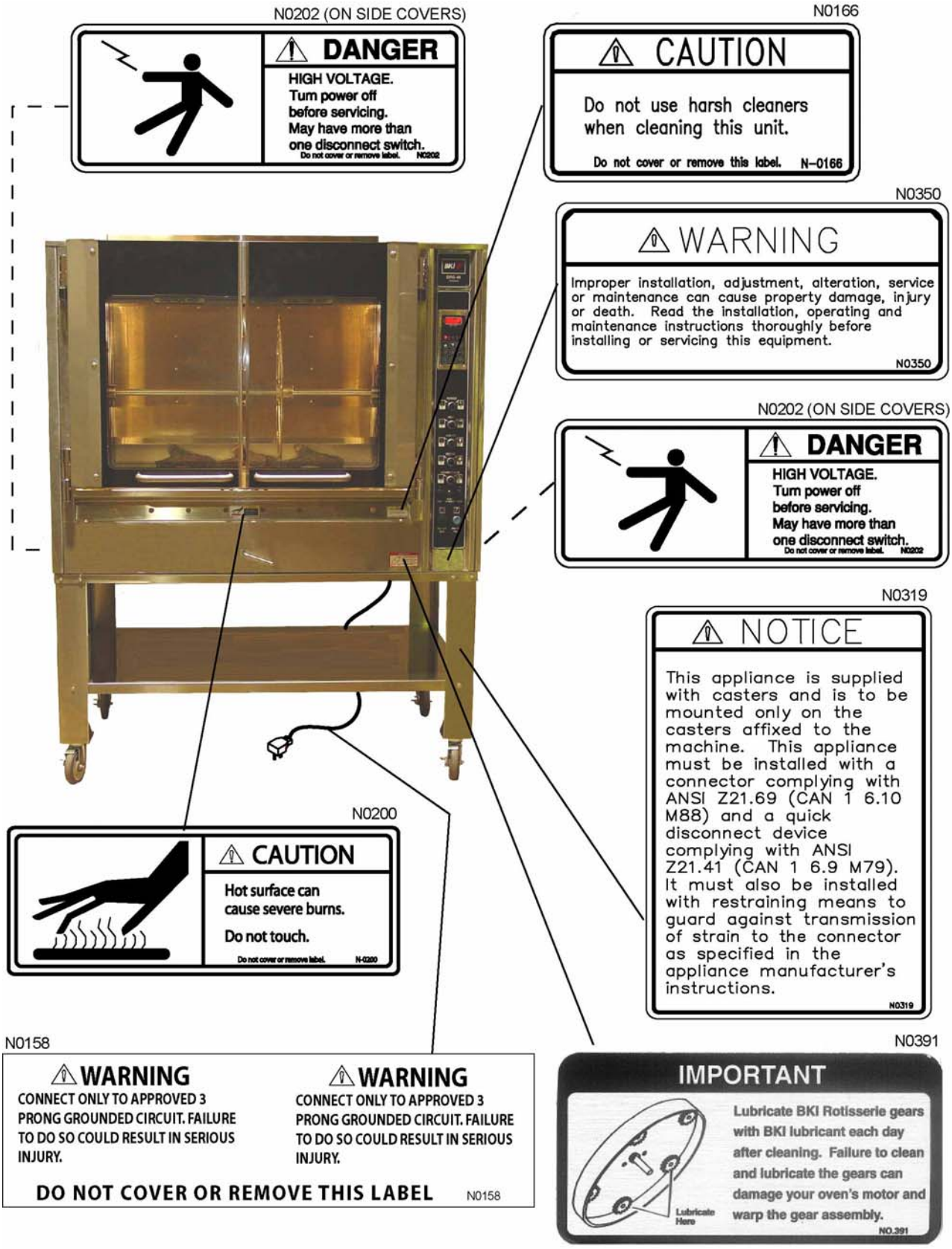
Observe proper clearance to combustibles as noted on the oven rating tag. Never place anything on top of the oven. The flues on top of the oven should be a minimum horizontal distance of 6 inches from any combustible material. Never place any combustible materials above the top of the oven. Never use any solvents near the oven. The open flame inside the oven could ignite solvent fumes, resulting in a fire or explosion.



Do Not Smoke Near The Oven

This oven uses combustible fuels to operate. Smoking near this oven could possibly cause a fire. Do not allow anyone to smoke near this oven.

Safety Labels


N0202 (ON SIDE COVERS)
DANGER
HIGH VOLTAGE.
Turn power off
before servicing.
May have more than
one disconnect switch.
Do not cover or remove label. N0202
N0166
CAUTION
Do not use harsh cleaners
when cleaning this unit.
Do not cover or remove this label. N-0166
N0350
WARNING
Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.
N0350
N0202 (ON SIDE COVERS)
DANGER
HIGH VOLTAGE.
Turn power off
before servicing.
May have more than
one disconnect switch.
Do not cover or remove label. N0202
N0319
NOTICE
This appliance is supplied with casters and is to be mounted only on the casters affixed to the machine. This appliance must be installed with a connector complying with ANSI Z21.69 (CAN 1 6.10 M88) and a quick disconnect device complying with ANSI Z21.41 (CAN 1 6.9 M79). It must also be installed with restraining means to guard against transmission of strain to the connector as specified in the appliance manufacturer's instructions.
N0319
N0200
CAUTION
Hot surface can
cause severe burns.
Do not touch.
Do not cover or remove label. N-0200
N0158
WARNING
CONNECT ONLY TO APPROVED 3 PRONG GROUNDED CIRCUIT. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY.
WARNING
CONNECT ONLY TO APPROVED 3 PRONG GROUNDED CIRCUIT. FAILURE TO DO SO COULD RESULT IN SERIOUS INJURY.
DO NOT COVER OR REMOVE THIS LABEL N0158
N0391
IMPORTANT
Lubricate Here
Lubricate BKI Rotisserie gears with BKI lubricant each day after cleaning. Failure to clean and lubricate the gears can damage your oven's motor and warp the gear assembly.
NO.391

NORMAL OPERATION - OPÉRATION NORMALE

1. Turn the main POWER switch On. From cold, the controller will display "too Cool".
   Mettez le contact "alimentation PRINCIPALE" en marche. Du froid, le contrôleur montrera le "too Cool"
2. Press the ITEM SELECT button to select the desired program.
   Appuyez sur le bouton CHOISI d'ARTICLE pour choisir le programme désiré.
3. Turn the ROTOR switch On.
   Mettez le commutateur de ROTOR en marche.
4. Turn the LOWER FLAME switch On.
   Mettez le commutateur INFÉRIEUR de FLAMME en marche.
5. Turn the HEAT switch On.
   Mettez le commutateur de la CHALEUR en marche.
6. Unit will pre-heat. When it reaches the programmed temperature, the controller will display "rEdy".
   L'unité préchauffera. Quand elle atteint la température programmée, le contrôleur montrera le "rEdy".
7. Open the doors and load product. Close the doors once product is loaded.
   Appuyez sur le bouton CHOISI d'ARTICLE pour choisir le programme désiré.
8. Press the START/STOP button to start the cook cycle.
   Appuyez sur le bouton DE DÉBUT ET DE FIN pour commencer le cycle de cuisinier.
9. When the cook cycle ends, press the START/STOP or the HOLD button.
   Quand les fins de cycle de cuisinier, appuient sur le bouton DE DÉBUT ET DE FIN ou de PRISE.

NORMAL SHUTOFF - INTERRUPTION NORMALE

1. Turn HEAT and LOWER FLAME switch off. Open doors and allow unit to cool for 5 minutes.
   Tournez la CHALEUR et ABAISSEZ le commutateur de FLAMME au loin. Ouvrez les portes et permettez à l'unité de se refroidir pendant 5 minutes
2. Turn LIGHTS, ROTOR and MAIN POWER switches off.
   Arrêtez les contacts de LUMIÈRES, de ROTOR et "alimentation PRINCIPALE".

OPERATION AFTER GAS OR POWER OUTAGE - OPÉRATION APRÈS PANNE DE GAZ OU DE PUISSANCE

The oven will shut off automatically if the gas supply or electrical power is interrupted. If, either of these conditions occur you should perform the following procedure:

Le four coupera automatiquement si l'offre de gaz ou le courant électrique est interrompue. Si, l'une ou l'autre de ces conditions se produisent vous devriez exécuter le procédé suivant :

1. Place the POWER, HEAT, LOWER FLAME, LIGHTS and ROTOR switches (located on the front panel) in the "OFF" position.
   Placez la PUISSANCE, la CHALEUR, les commutateurs INFÉRIEURS de FLAMME, de LUMIÈRES et de ROTOR (situés sur le panneau plan) dans le "OFF" ; placez.
2. Wait at least five minutes to allow any gas that may have accumulated in the burner compartment to escape.
   Attente au moins cinq minutes pour permettre tout gaz qui a pu s'être accumulé dans le compartiment de brûleur pour s'échapper.
3. Follow normal operating procedures once electrical power or gas is restored.
   Suivez les modes opératoires normaux une fois que le courant électrique ou le gaz est reconstitué.

Installation

Inspection for Shipping Damage

It is the owners' responsibility to file all freight claims with the delivering truck line. Inspect all cartons and crates for damage as soon as they arrive. If damage to cartons or crates is found, or if a shortage is found, note this on the bill of lading (all copies) prior to signing.

If damage is found when the equipment is opened, immediately call the delivering truck line and follow up the call with a written report indicating concealed damage to your shipment. Ask for an immediate inspection of your concealed damage item. Packaging material **MUST** be retained to show the inspector from the truck line.

Preparation

There are several things the installer must know before installing the oven. These are listed below:

NOTICE When using natural gas, the supply pressure must never drop below 7 inches of water column. If the supply pressure can exceed 14 inches of water column, a pressure regulator must be used. This regulator must be sized to ensure that the pressure never goes below 7 inches of water column while the unit is in operation.

- The oven installation must conform with city or county standards for gas appliances and gas piping. If your area does not have local codes, consult the *National Fuel Gas Code, ANSI Z223.1/NFPA 54*, or the *Natural Gas and Propane Installation Code, CSA B149.1*. In Europe, city and country codes are enforced.

⚠WARNING Do not attempt to test the gas pressure of your oven. Pressure testing should be done only by an authorized Service Agent.

- During any pressure testing of the gas supply system, the oven must be protected. The oven and its individual shutoff valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of ½ psi (3.5 kPa). The oven must be isolated from the gas supply piping system by closing its individual manual shutoff valve during any pressure testing of the gas supply piping system at test pressures equal to or less than ½ psi (3.5 kPa).

- The oven must be electrically grounded to conform with the local code of your city or county. If your area does not have local codes, consult the latest version of the *National Electrical Code ANSI/NFPA 70*, or the *Canadian Electrical Code, CSA C22.2*. In EUROPE, city and country codes are enforced.

- A schematic diagram of the unit is located inside the control cabinet.

- The Authorized Service Agent that installs your oven must connect the cord set at the rear of the oven to an electrical source with a voltage matching that stamped on the name and rating tag. Refer to the wiring diagrams in this manual.

- Make sure a connector is used that complies with the Standard for *Connectors for Movable Gas Appliances, ANSI Z21.69 • CSA 6.16*.

- Make sure a quick-disconnect device is used that complies with the Standard for *Quick-Disconnect Devices for Use With Gas Fuel, ANSI Z21.41 • CSA 6.9*.

- In Europe, the installer must supply the gas supply connector.

- Make sure a restraining device is used that complies with the Standard for *Commercial Gas Ranges, ANSI Z83.11/CGA 1.8* (such as BKI part number FT0279) to guard against transmission of strain to the connector.

- The drain on the DRG-40 is a ¾" ball valve. Under NO circumstances, should this valve be hard plumbed to a drain line. A short nipple may be used to direct the discharge into a 2" drain that should have a bell reducer (to act as a funnel) placed on the end of drain line. The best configuration is to place this bell reducer just below the valve. Using a ¾" line to come out from under the oven is not recommended, as it would be easy to plug up.

- Retain the manual for future reference.

Location and Clearance

Install your oven in a well-ventilated area. This will ensure that the gas burns properly and will help prevent any fires. When deciding on a location, remember the following:

- All gas-burning appliances need enough fresh air for combustion.

- Locate the oven where it can be vented into an adequate exhaust hood. Your local gas utility must approve your ventilation system. Consult a ventilation or heating company to help you design an adequate system that meets ventilation codes and standards for your city or county. In Europe, install according to local codes.

- Keep the oven away from any combustibles such as curtains, wood paneling, boxes, or towels. The flue riser at the top of the oven should also be kept away from any flammable material.

- Observe proper clearance to combustibles as noted on the oven rating tag. Never place anything on top of the oven. The flues on top of the oven should be a minimum horizontal distance of 6 inches from any combustible material. Never place any combustible materials above the top of the oven. Never use any solvents near the oven. The open flame inside the oven could ignite solvent fumes, resulting in a fire or explosion.

- Keep the work area around the oven free of objects that might block fresh air or that might cause a fire.

- Do not attach an extension to the exhaust stack. This may stop the burner from operating properly, cause the burner to go off, or, cause other dangerous malfunctions. It may also cause a strong draft in the room. A draft can interfere with the burner.

- Do not locate the oven near strong drafts. Keep the oven away from doors that are opened and closed frequently.

Installation Procedure

⚠WARNING Ensure that an authorized BKI service agent installs the oven. An authorized BKI service agent should be a qualified gas service technician and a licensed electrician.

⚠DANGER Failure to restrain the oven could allow it to move, causing a possible break in the gas line resulting in an explosive condition.

1. Install an ANSI Z83.11/CGA 1.8 compliant restraining device (such as BKI part number FT0279) per the instructions below:

    a. Mount the wall attachment according the restraining device manufacturer instructions.

    b. If possible, loop one end of the restraining cable around one of the rear legs and attach the spring-loaded hook to the cable then attach the other spring-loaded hook to the wall attachment.

If you are unable to do this, drill a small ¼" hole through the back flange of the shelf, then follow the restraining device manufacturer instructions to finish the installation.

⚠WARNING Use appliance connectors and quick-disconnect devices that are in compliance with the applicable ANSI and CSA standards.

2. Attach an appliance connector to the oven according to the instructions provided by the appliance connector manufacturer.

3. Connect the gas supply to the oven. In Europe, the gas supplier must provide the gas hookup connecting line.

4. Lock the casters so the oven does not move. Every time you use the oven, make sure the casters are locked so the oven cannot move. (In Canada: refer to caster codes CAN 1-6.10 M88 and CAN 1-6.9 M79.)

5. Turn on the gas at the gas supply valve.

6. Check for gas leaks from the gas supply to the oven gas valve using a soap and water solution. If a leak is detected, tighten the connection where the leak occurs.

7. Connect the three-prong (grounded) plug directly into a properly grounded three-prong receptacle.

8. Apply power to the oven.

9. Perform the following procedures provided in the Startup and Checkout section of the *VR8105, VR8205, and VR8305 Direct Ignition Combination Gas Controls Installation Instructions (69-1226-2)*. Refer to Appendix A.

    - Perform Gas Leak Test
    - Turn On System
    - Turn On Main Burner
    - Check and Adjust Gas Input Burner Ignition (for Standard model Pressure Regulator)

10. Place the **HEAT** switch, **LOWER FLAME** switch, and **LIGHTS** switch in the "OFF" position.

11. Wait at least five minutes to allow oven to cool.

12. Place the **POWER** switch and **ROTOR** switch in the "OFF" position.

Gas Conversion Instructions

To convert the gas system from a Natural Gas to LP Gas application or vice versa, contact the BKI Technical Service Department, toll free: 1-800-927-6887. Outside the U.S., call 1-864-963-3471.

Replacement Parts

Use the information in this section to identify replacement parts. To order replacement parts, call your local ***BKI*** sales and service representative. Before calling, please note the serial number on the rating tag affixed to the unit.

Assemblies

Description	Assembly #	Figure #	Table #
CONTROL PANEL	AN44022900	Figure 1	Table 1
THERMOCOUPLE	AA44012400	Figure 2	Table 2
UPPER GAS PIPING	AB44001100	Figure 3	Table 3
DUAL PASSIVE ROTOR	AB44106400	Figure 4	Table 4
SINGLE/DUAL DRIVE ROTOR	AB44106500	Figure 5	Table 5
SINGLE PASSIVE ROTOR	AB44015500	Figure 6	Table 6
JACKSHAFT	AB44107500	Figure 7	Table 7
DRIVE SIDE DOOR	AB44107800	Figure 8	Table 8
PASSIVE SIDE DOOR	AB44108300	Figure 9	Table 9
WATER PIPE	AN44013500	Figure 10	Table 10

Figure 1. *Control Panel (AN44022900)*

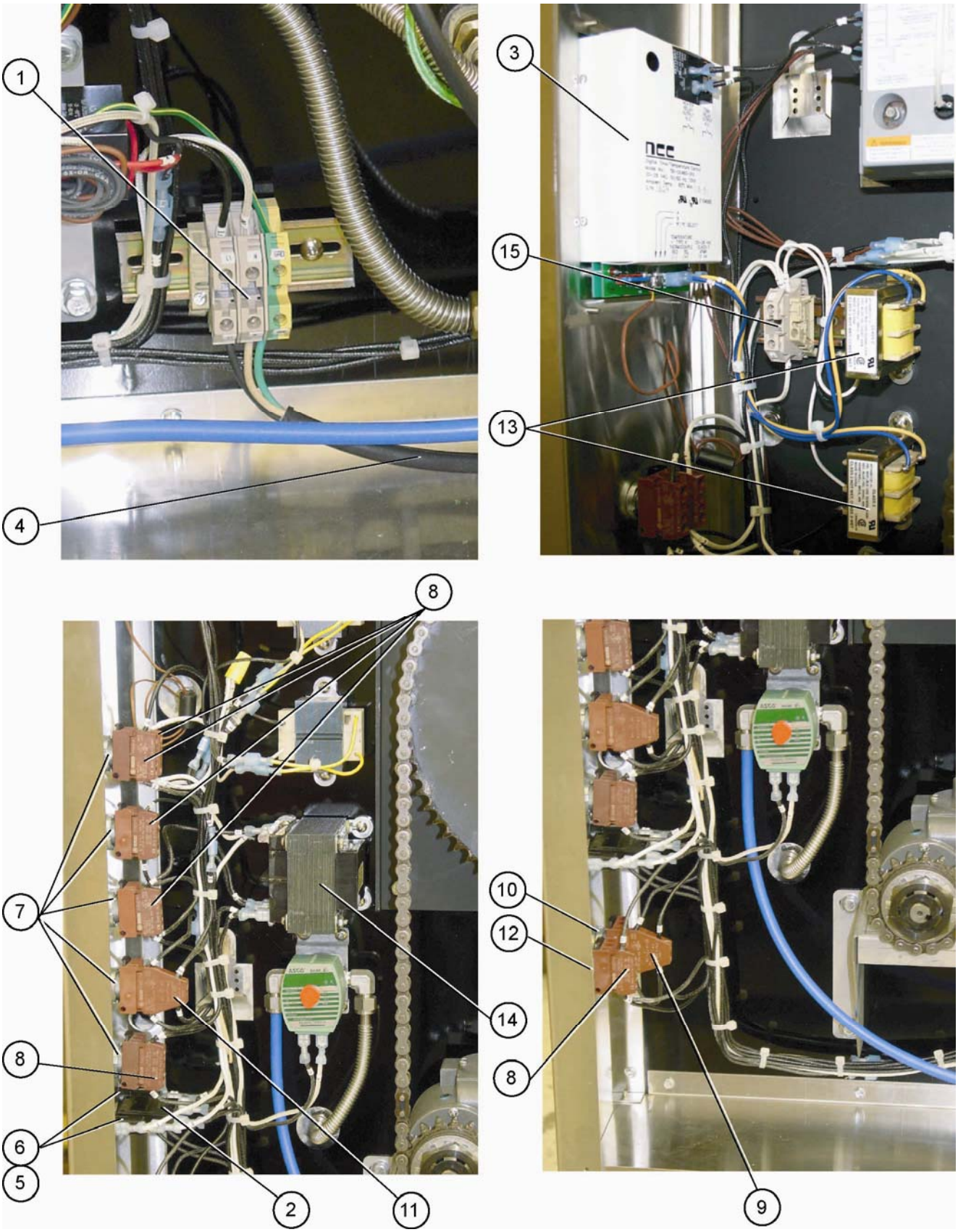


Table 1. *Control Panel (AN44022900) Parts*

ITEM #	PART #	QTY	DESCRIPTION
1	AB44007200	1	TERM BLOCK ASSY DRG
2	CB0058	1	BREAKER, CIRCUIT 1 AMP 250V
3	CP0022	1	CONTROLLER, DIGT TEMP/TIME
4	CS0005	1	CORD SET, 115V 7'6"
5	F0097	2	FUSE, 15A 300V SC15 TIME DELAY
6	FH0001	2	FUSE HOLDER, 15A 300V HPF-EE
7	S0304	5	SWITCH, 2 POS OPERATOR BLK
8	S0307	6	SWITCH, NO BLOCK GE P9B10VN
9	S0308	1	SWITCH, NO/NC BLOCK GE 9PB11VN
10	S0309	1	SWITCH, MUSHROOM PUSH BLACK
11	S0339	2	SWITCH, CONTACT BLOCK 2 NO
12	S0340	1	SWITCH, PUSH BUTTON BLUE RECESSED
13	TF0005	2	TRANSFORMER, 120-24V LGF
14	TF0045	1	TRANSFORMER, 230/115 PRI 175VA
15	AB44023800	1	TERM BLOCK ASSY NEUTRAL LINES DRG40

Figure 2. *Thermocouple (AA44012400)*

Table 2. *Thermocouple (AA44012400) Parts*

ITEM #	PART #	QTY	DESCRIPTION
	F0173	1	FERRITE BEAD
	T0020	0.25	TUBING, HEAT SHRINK 1/4 PLASTIC
	T0085	1	THERMOCOUPLE, TYPE K T-2016
	TU0012	0.25	TUBING, RED SILICONE SRT-110

Figure 3. *Upper Gas Piping (AB44001100)*

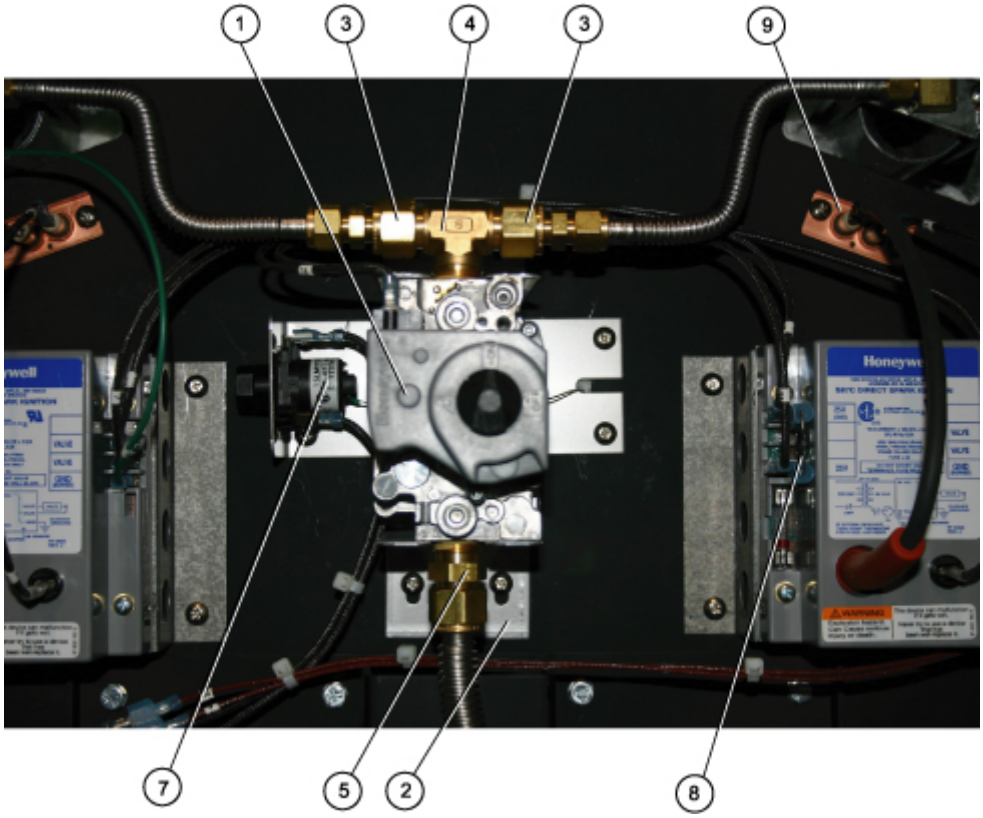


Table 3. *Upper Gas Piping (AB44001100) Parts*

ITEM #	PART #	QTY	DESCRIPTION
1	C0739	1	VALVE, GAS VR8205A2123
2	FB44007109	2	GAS VALVE MOUNT DRG
3	FT0521	2	REDUCER, TUBE END 1/2-3/8
4	FT0522	1	TEE, MALE BRANCH 1/2-1/2-1/2
5	FT0523	1	CONNECTOR, MALE 1/2 NPT-1/2 COMPRESS
6	SCR280	4	SCREW, 8-32 X 3/8 PHIL TRUSS
7	T0008*	1	THERMOSTAT, HI LIMIT 572¦F
8	AN44116100*	3	SURGE SUPPRESSOR (ONE USED ON EACH IGNITION MODULE)
9	MB44115400*	2	IGNITION/SENSE PROBE

** - These components are not part of the Upper Gas Piping Assembly (AB44001100) but are shown here for reference only.*

Figure 4. *Dual Passive Rotor (AB44106400)*

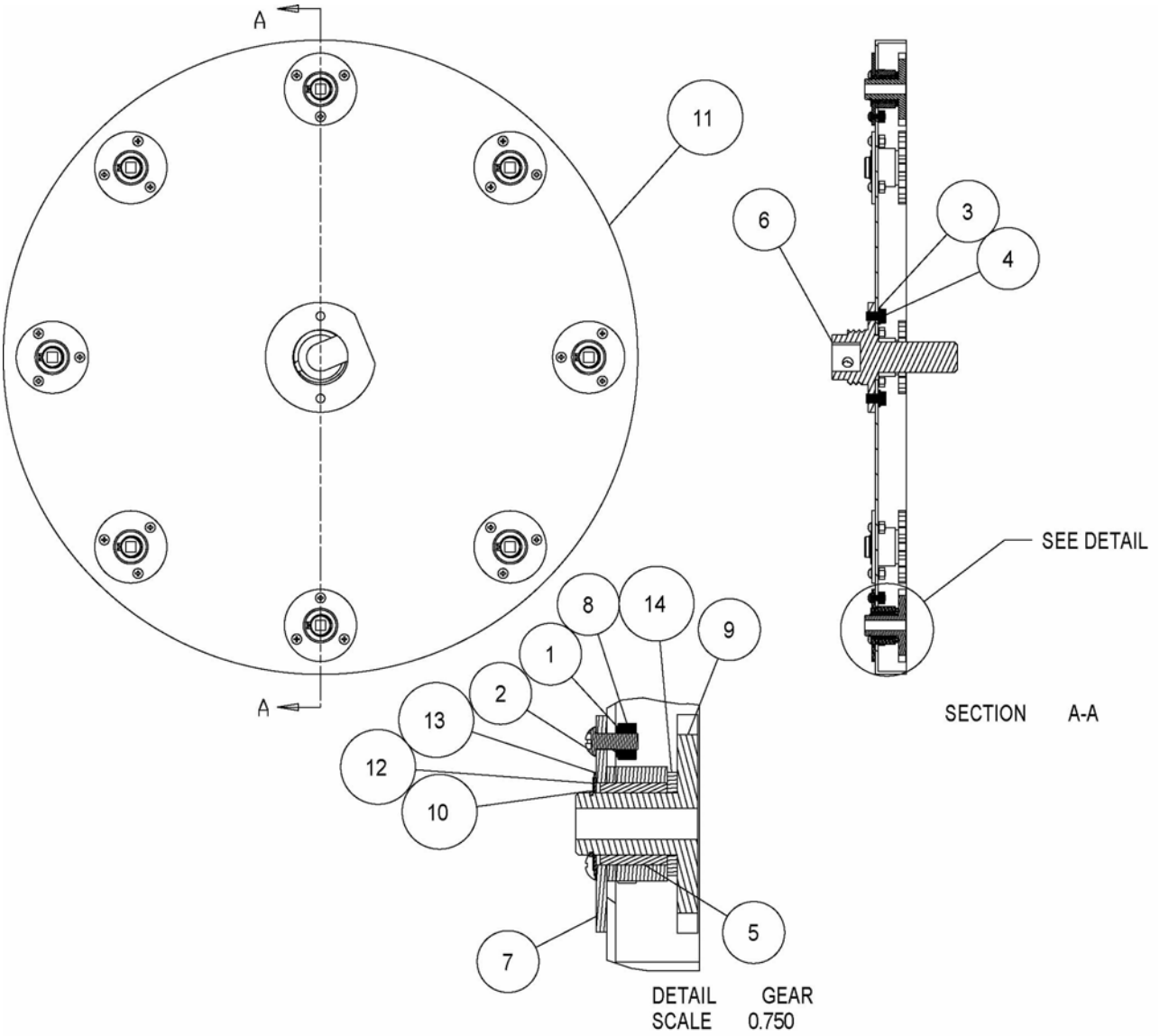


Table 4. *Dual Passive Rotor (AB44106400) Parts*

ITEM #	PART #	QTY	DESCRIPTION
1	WSH093	24	WASHER, #10 LOCK
2	SCR383	24	SCREW, 10-24 X 1/2" PHIL TRUSS HD
3	WSH260	2	WASHER, 5/16 S/S LOCKWASHER
4	SCR384	2	SCREW, 5/16-18 X 1/2 S/S HEX
5	B0241	8	BEARING, .75 ID X 1. OD .813 L
6	H0106	1	HUB, PASSIVE DUAL DRG
7	H0067	8	HUB, PLANETARY GEAR 951
8	NUT131	24	NUT, 10-24 SS 18-8 HEX
9	G0103	8	GEAR, PLANETARY(5) 6 DIA PITCH
10	FT0366	8	RETAINING RING, PLANETARY GEAR
11	RO0027	1	ROTOR, 23" DIA. ACTIVE DRG40
12	FT0367	8	SHIM, PLANETARY GEAR DR34
13	WSH256	8	WASHER, THRUST .765ID X 1.25OD
14	WSH257	8	WASHER, THRUST .765ID X 1.25OD

Figure 5. *Single/Dual Drive Rotor (AB44106500)*

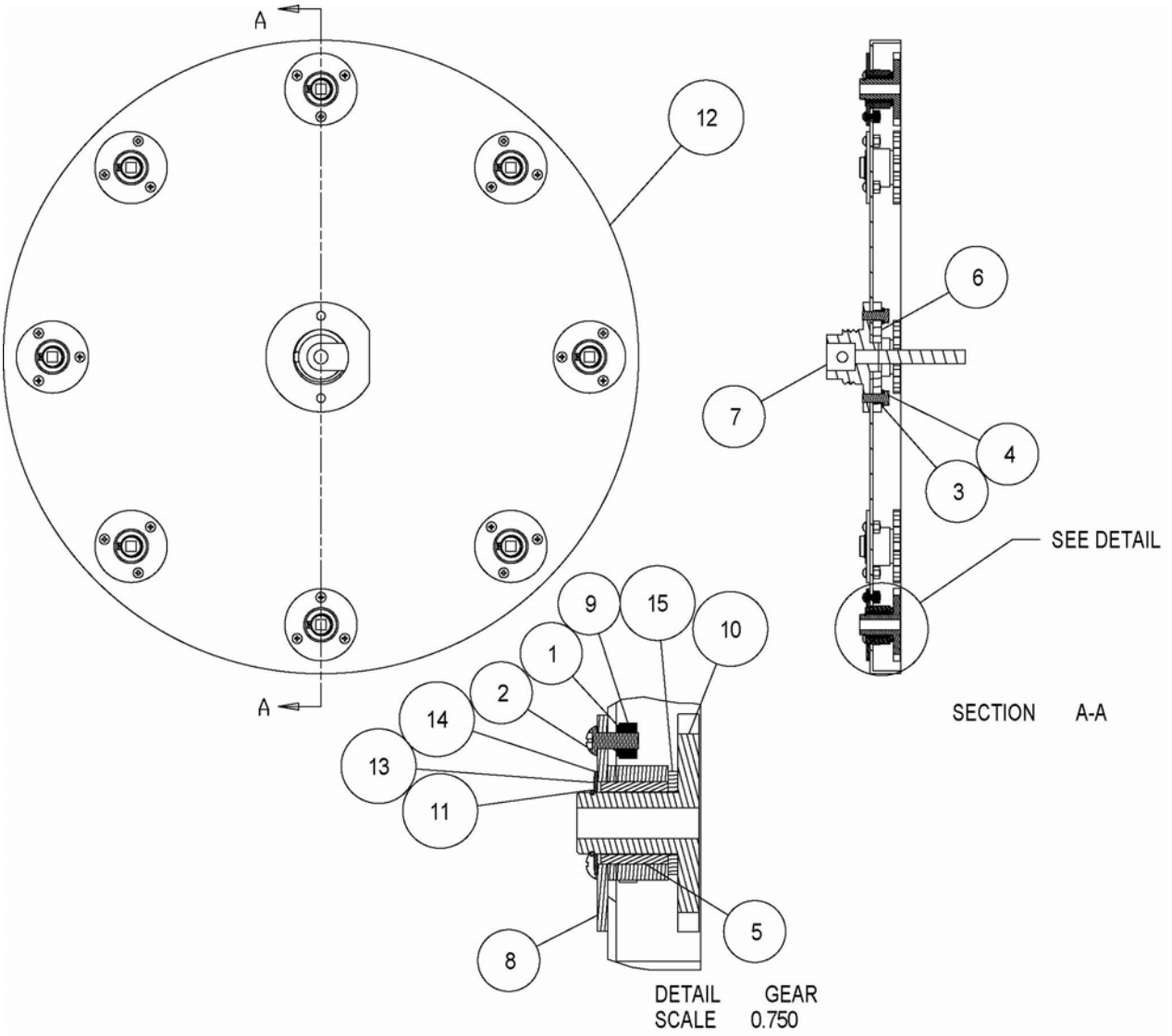


Table 5. *Single/Dual Drive Rotor (AB44106500) Parts*

ITEM #	PART #	QTY	DESCRIPTION
1	WSH093	24	WASHER, #10 LOCK
2	SCR383	24	SCREW, 10-24 X 1/2" PHIL TRUSS HD
3	WSH260	2	WASHER, 5/16 S/S LOCKWASHER
4	SCR399	2	SCREW, 5/16-18 X 3/4 HEX HD
5	B0241	8	BEARING, .75 ID X 1. OD .813 L
6	MC0054	1	DRIVE COUPLING, MALE DRG40
7	H0104	1	HUB, DRIVE SIDE DRG
8	H0067	8	HUB, PLANETARY GEAR 951
9	NUT131	24	NUT, 10-24 SS 18-8 HEX
10	G0103	8	GEAR, PLANETARY(5) 6 DIA PITCH
11	FT0366	8	RETAINING RING, PLANETARY GEAR
12	RO0027	1	ROTOR, 23" DIA. ACTIVE DRG40
13	FT0367	8	SHIM, PLANETARY GEAR DR34
14	WSH256	8	WASHER, THRUST .765ID X 1.25OD
15	WSH257	8	WASHER, THRUST .765ID X 1.25OD

Figure 6. *Single Passive Rotor (AB44015500)*

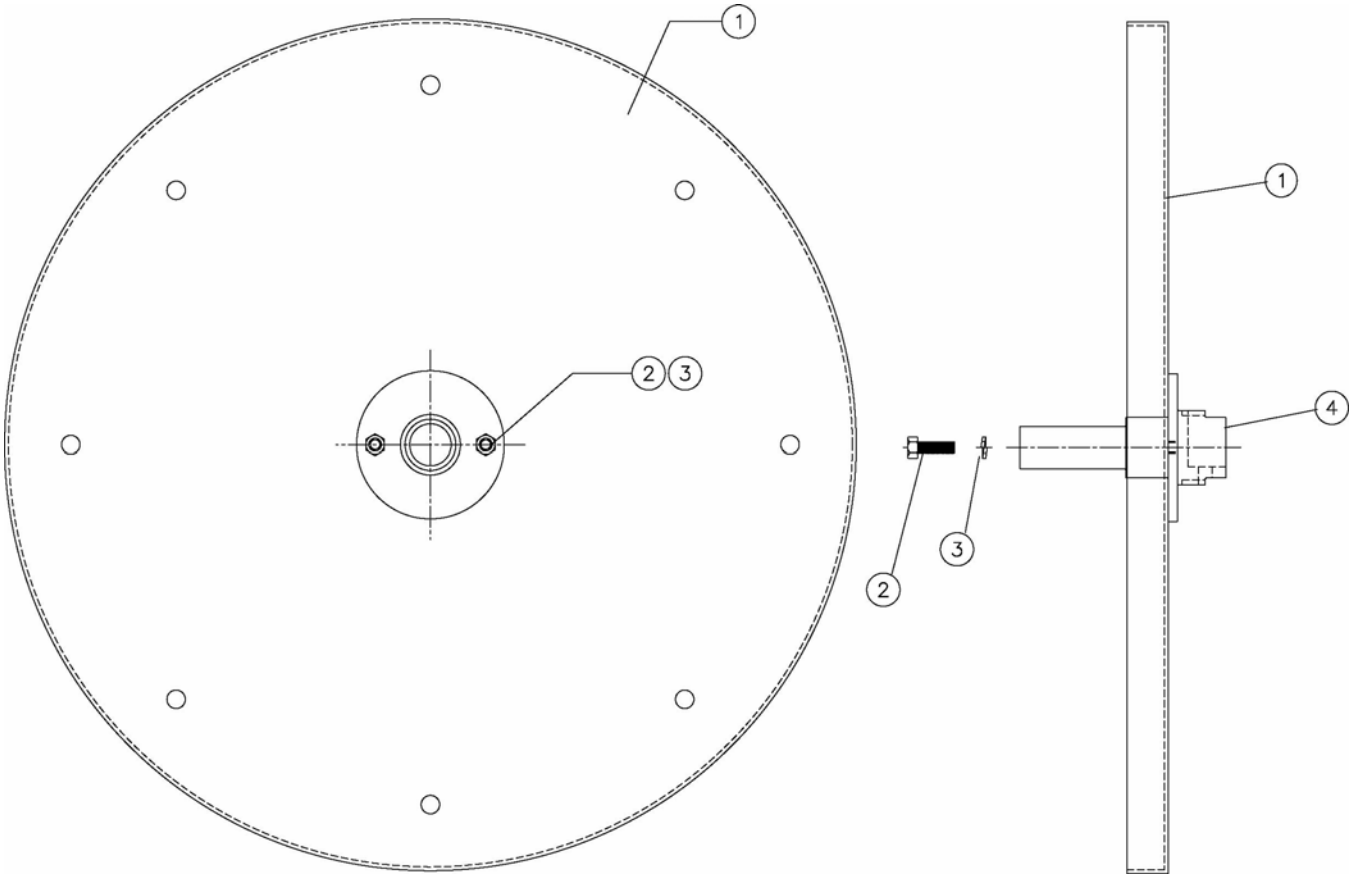


Table 6. *Single Passive Rotor (AB44015500) Parts*

ITEM #	PART #	QTY	DESCRIPTION
1	RO0028	1	ROTOR, 23" DIA. PASSIVE DRG40
2	SCR384	2	SCREW, 5/16-18 X 1/2 HEX CAP
3	WSH260	2	WASHER, 5/16 S/S LOCKWASHER
4	H0105	1	HUB, PASSIVE SINGLE

Figure 7. *Jackshaft (AB44107500)*

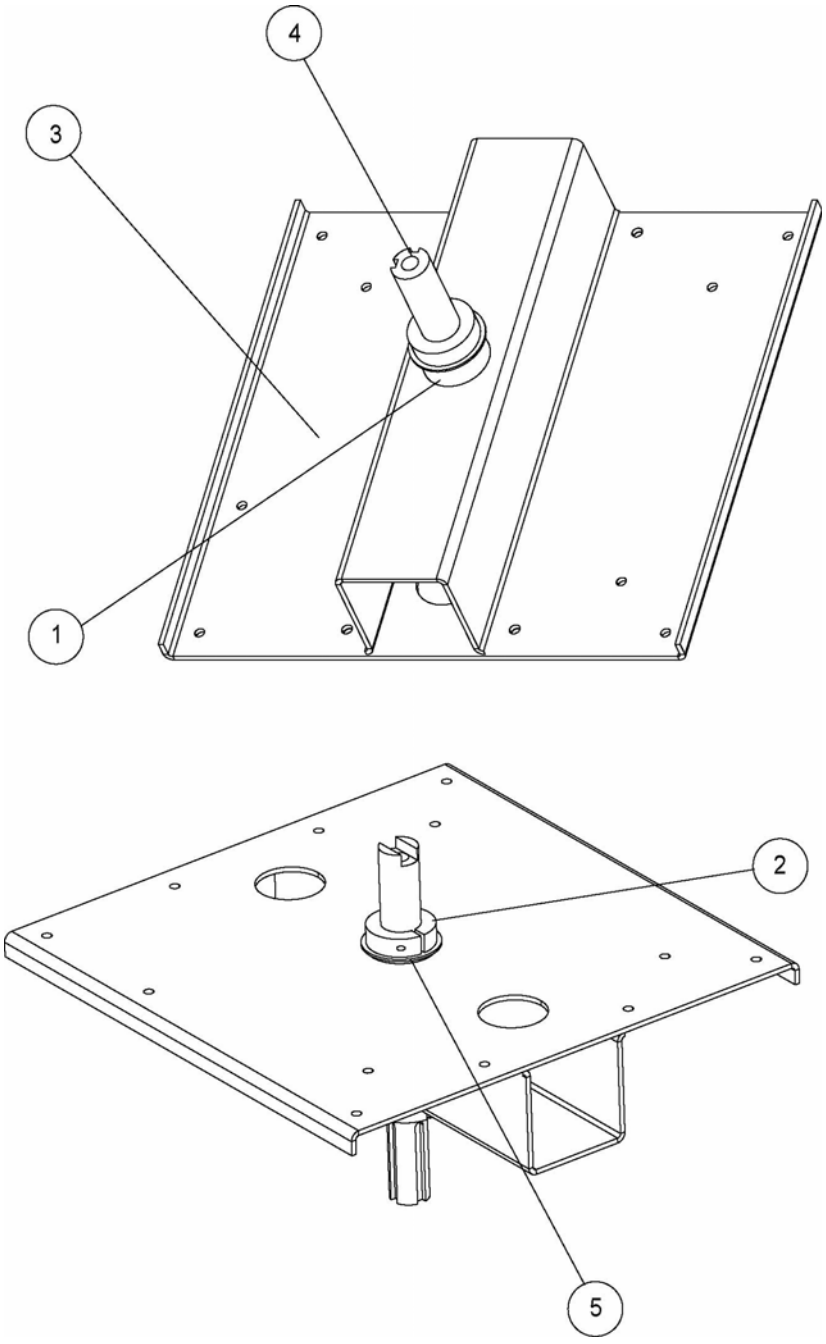


Table 7. *Jackshaft (AB44107500) Parts*

ITEM #	PART #	QTY	DESCRIPTION
1	B0239	2	BEARING, FCJ16F20-8
2	FT0424	2	CLAMP COLLAR C12L14 1X1.75X.5
3	PN44113800	1	JACKSHAFT MOUNT PAINTED DRG-40
4	SH0104	1	SHAFT, ROTOR MOTOR DRIVE
5	WSH253	2	WASHER, THRUST 1.025X2 PER PRINT

Figure 8. *Drive Side Door (AB44107800)*

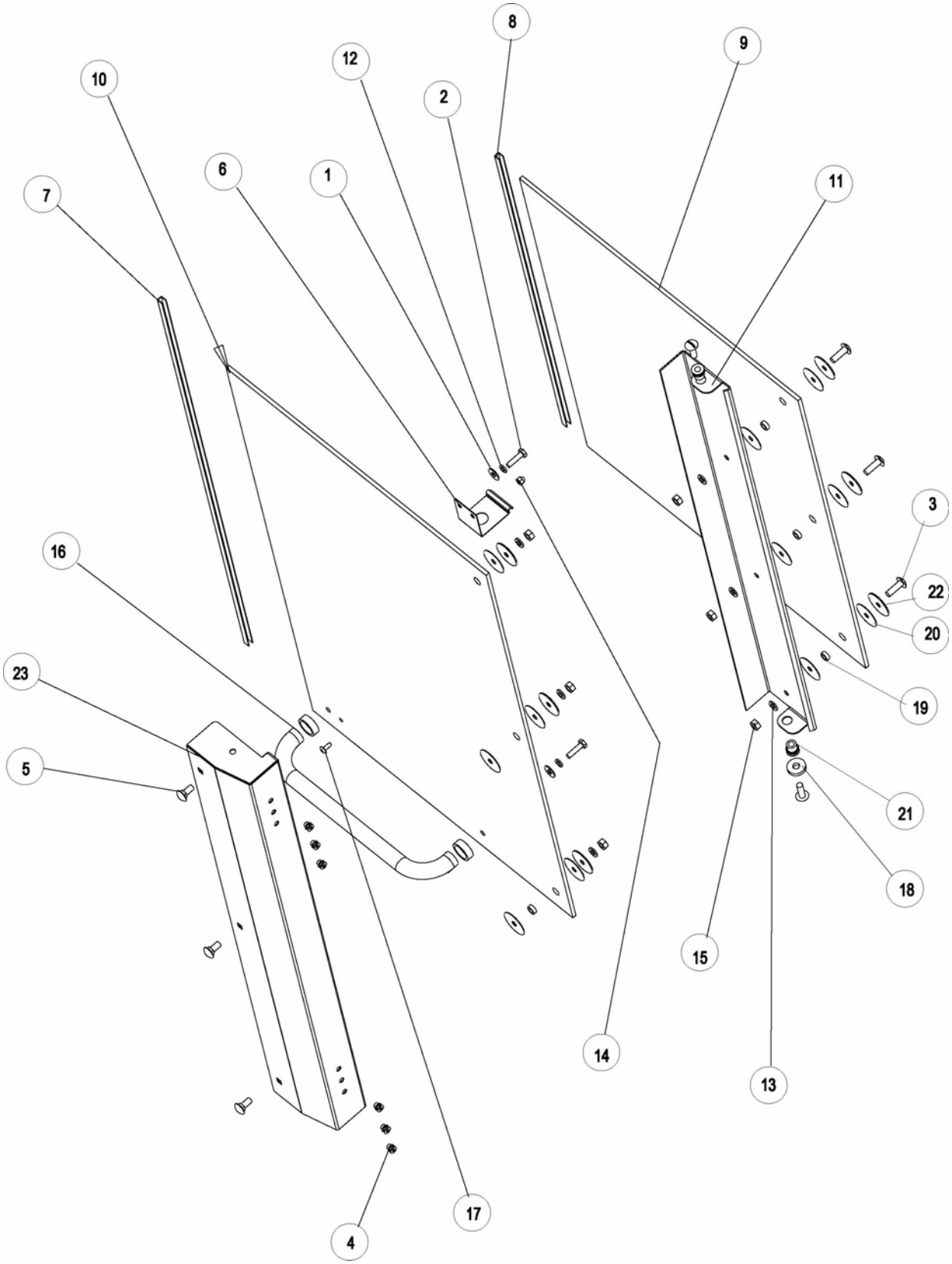


Table 8. *Drive Side Door (AB44107800) Parts*

ITEM #	PART #	QTY	DESCRIPTION
1	WSH266	2	WASHER, 1/4" FLAT S/S
2	SCR060	2	SCREW, 1/4-20 X 1 HEX CAP
3	BLT252	5	BOLT, 5/16-1 SLTD TRUSS
4	F0136	6	THREAD INSERT 10-24 STEEL HEX
5	BLT250	3	BOLT, 5/16-18 X 3/4 S/S CARRIAGE
6	FB44108803	1	DOOR GLASS LOCK DRG-40
7	MA44109000	1	GLASS TRIM, OUTER DOOR DRG-40
8	MA44109100	1	GLASS TRIM, INNER DOOR DRG-40
9	GL0272	1	GLASS, 25 X 21.625 TEMP
10	GL0271M	1	GLASS, MATRIX RH 32 X 20.188
11	FB44108002	1	INNER DOOR SUPPORT DR.SIDE DRG40
12	WSH044	2	WASHER, 1/4 LOCK ZINC PLTD
13	WSH260	6	WASHER, 5/16 S/S LOCKWASHER
14	NUT132	1	NUT, 10-24 SS 18-8 HEX CAP
15	NUT054	6	NUT, 5/16-18 HEX
16	H0131	1	HANDLE, TUBULAR S/S P47-1012
17	SCR383	1	SCREW, 10-24 X 1/2" PHIL TRUSS HD
18	SP0022	1	SPACER, DELRIN .375 ID X 1" OD
19	SP0041	6	SPACER, TEFLON-DOOR GLASS
20	FA44108900	12	WASHER, TEFLON DRG-40
21	F0086	2	THREAD INSERT 5/16-18 STEEL
22	WSH258	6	WASHER, FENDER 5/16 X 1 1/2
23	WB44107900	1	DOOR SUPPORT WELD. DRG-40

Figure 9. *Passive Side Door (AB44108300)*

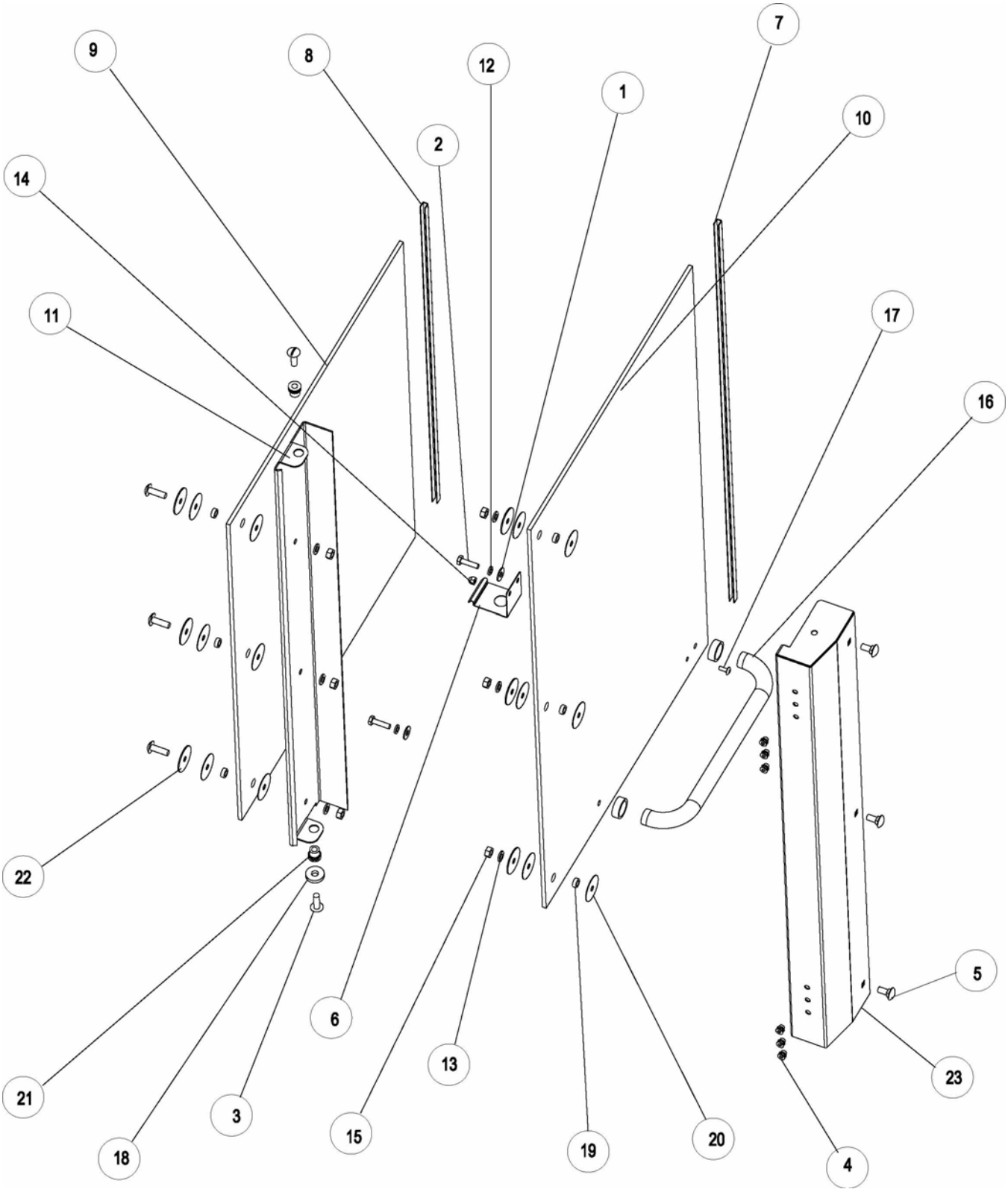


Table 9. *Passive Side Door (AB44108300) Parts*

ITEM #	PART #	QTY	DESCRIPTION
1	WSH266	2	WASHER, 1/4" FLAT S/S
2	SCR060	2	SCREW, 1/4-20 X 1 HEX CAP
3	BLT252	5	BOLT, 5/16-1 SLTD TRUSS
4	F0136	6	THREAD INSERT 10-24 STEEL HEX
5	BLT250	3	BOLT, 5/16-18 X 3/4 S/S CARRIAGE
6	FB44108803	1	DOOR GLASS LOCK DRG-40
7	MA44109000	1	GLASS TRIM, OUTER DOOR DRG-40
8	MA44109100	1	GLASS TRIM, INNER DOOR DRG-40
9	GL0272	1	GLASS, 25 X 21.625 TEMP
10	GL0270M	1	GLASS, MATRIX LH 32 X 20.188
11	FB44108502	1	INNER DR.SUPPORT PASS.SIDE DRG40
12	WSH044	2	WASHER, 1/4 LOCK ZINC PLTD
13	WSH260	6	WASHER, 5/16 S/S LOCKWASHER
14	NUT132	1	NUT, 10-24 SS 18-8 HEX CAP
15	NUT054	6	NUT, 5/16-18 HEX
16	H0131	1	HANDLE, TUBULAR S/S P47-1012
17	SCR383	1	SCREW, 10-24 X 1/2" PHIL TRUSS HD
18	SP0022	1	SPACER, DELRIN .375 ID X 1" OD
19	SP0041	6	SPACER, TEFLON-DOOR GLASS
20	FA44108900	12	WASHER, TEFLON DRG-40
21	F0086	2	THREAD INSERT 5/16-18 STEEL
22	WSH258	6	WASHER, FENDER 5/16 X 1 1/2
23	WB44107900	1	DOOR SUPPORT WELD. DRG-40

Figure 10. *Water Pipe (AN44013500)*

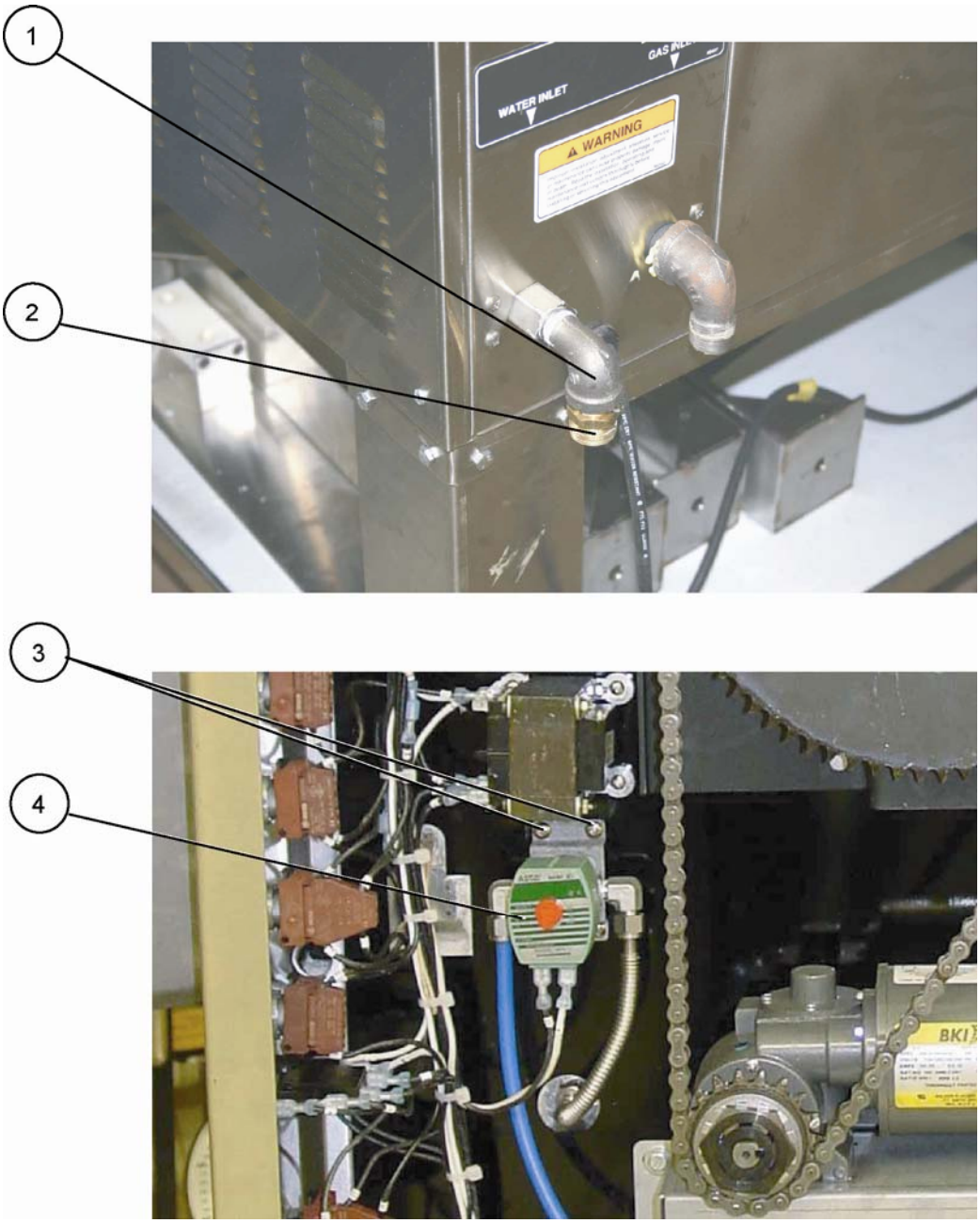


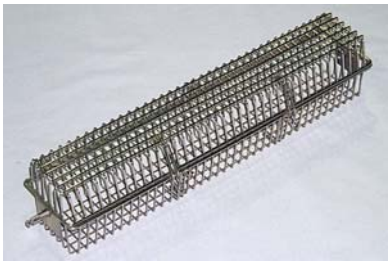
Table 10. *Water Pipe (AN44013500) Parts*

ITEM #	PART #	QTY	DESCRIPTION
1	FT0272	2	ELBOW, STREET, 90° ½” NPT, SS
2	FT0470	1	CONNECTOR, HOSE 3/4" X 1/2"NPT
3	SCR138	2	SCREW, 10 X 1/2 PHIL TR HD
4	SV0010	1	VALVE, SOLENOID 120/60

Accessories & Components

Description	Part #	Figure #	Item #
Accessories			
BASKET, MEAT LARGE CLAMSHELL (FOR DUAL SHAFT) BASKET, MEAT LARGE CLAMSHELL (FOR SINGLE SHAFT)	MB0015 MB0021	Figure 11	1
BASKET, MEAT SM CLAMSHELL (FOR DUAL SHAFT) BASKET, MEAT SM CLAMSHELL (FOR SINGLE SHAFT)	MB0011 MB0020	Figure 11	2
VEE SPIT 2 BIRD DRG (FOR DUAL SHAFT) VEE SPIT 3 BIRD DRG (FOR DUAL SHAFT) VEE SPIT 6 BIRD DRG (FOR SINGLE SHAFT)	MF0031 MF0021 MF0028	Figure 11	3
INSULATED MITT 13"	G0052	Figure 11	4
HOSE, 60" GAS CONNECTOR W/ RESTRAINT (FT0279)	H0136	Figure 11	5
RESTRAINT (ONLY)	FT0279	Figure 11	6
PERMATEX INDUST. SUPERLUBE	L0200	Figure 11	7
Components			
LOG, SPLIT BRANCH 9-1/2" (3)	L0500	Figure 11	8
CASTER 5"1/2-13 X 3/4 STUD LOCK	C0425	Figure 11	9
VALVE, GAS VR8205A2123	C0739	Figure 11	10
DIRECT SPARK IGNITION	C0740	Figure 11	11
IGN.PROBE, LOWER BURNER DRG-40	MB44115500	Figure 11	12
IGN.PROBE, UPPER BURNER DRG-40	MB44115400	Figure 11	13
MOTOR, 110-120/220-240 .94/.55 AMP	M0087	Figure 11	14
CHAIN, #40 ROLLER 106 PITCHES	CH0014	Figure 11	15
LAMPHOLDER W/BULB 12V 20W (OSRAM)	LH0024	Figure 11	16
DUAL REMOVABLE SHAFT	AB44106600	Figure 11	17
ROTOR, CENTER DRG (For Dual Rotor Configuration)	RO0031	Figure 11	18
SHAFT ASSY, SGL REMOV DRG	AB44015000	Figure 11	19

Figure 11. *Accessories & Components*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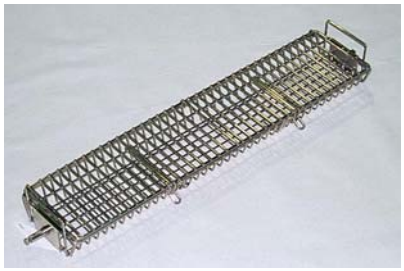
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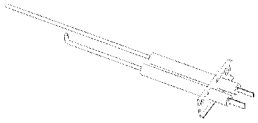

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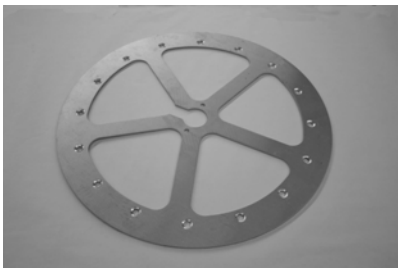

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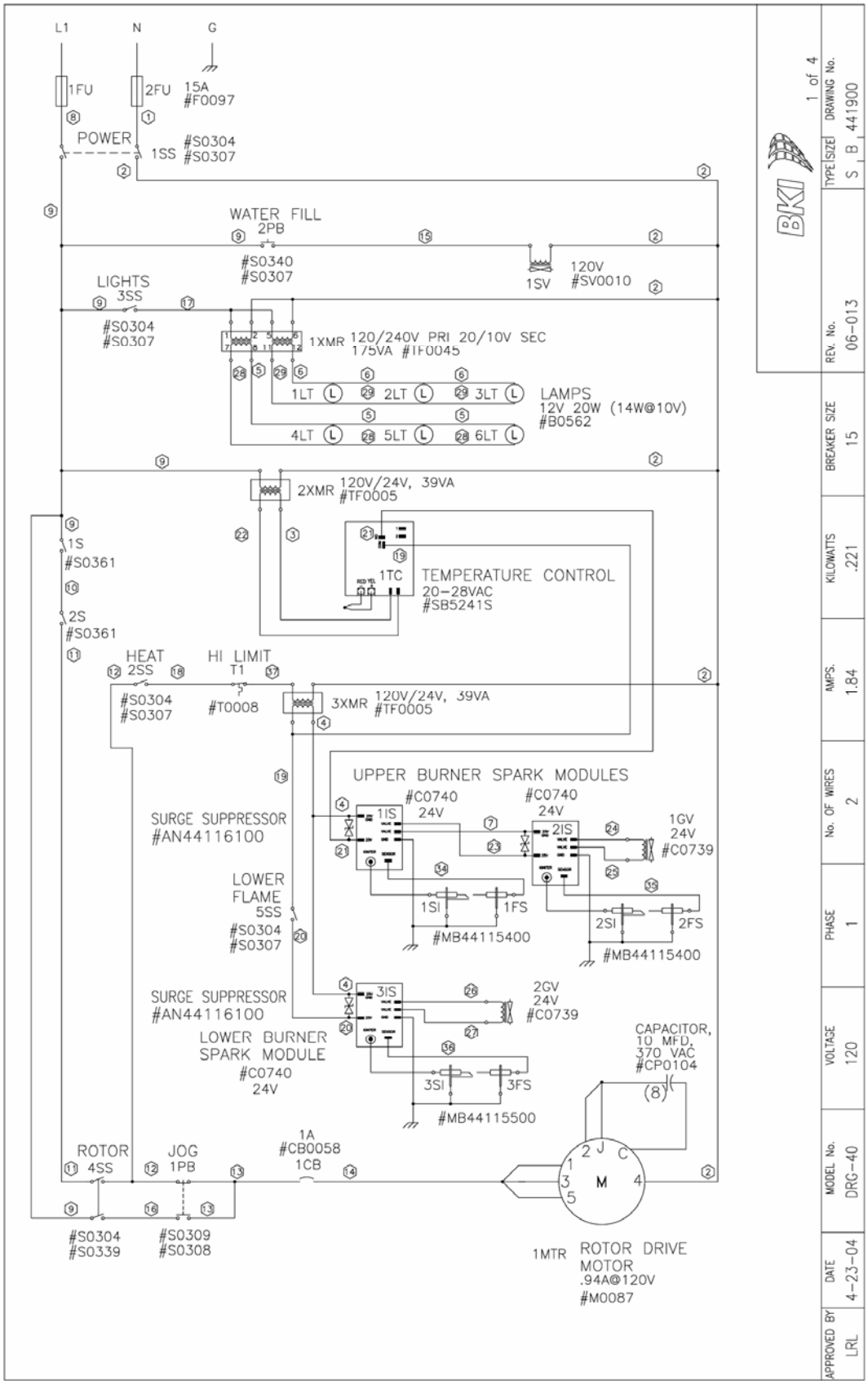
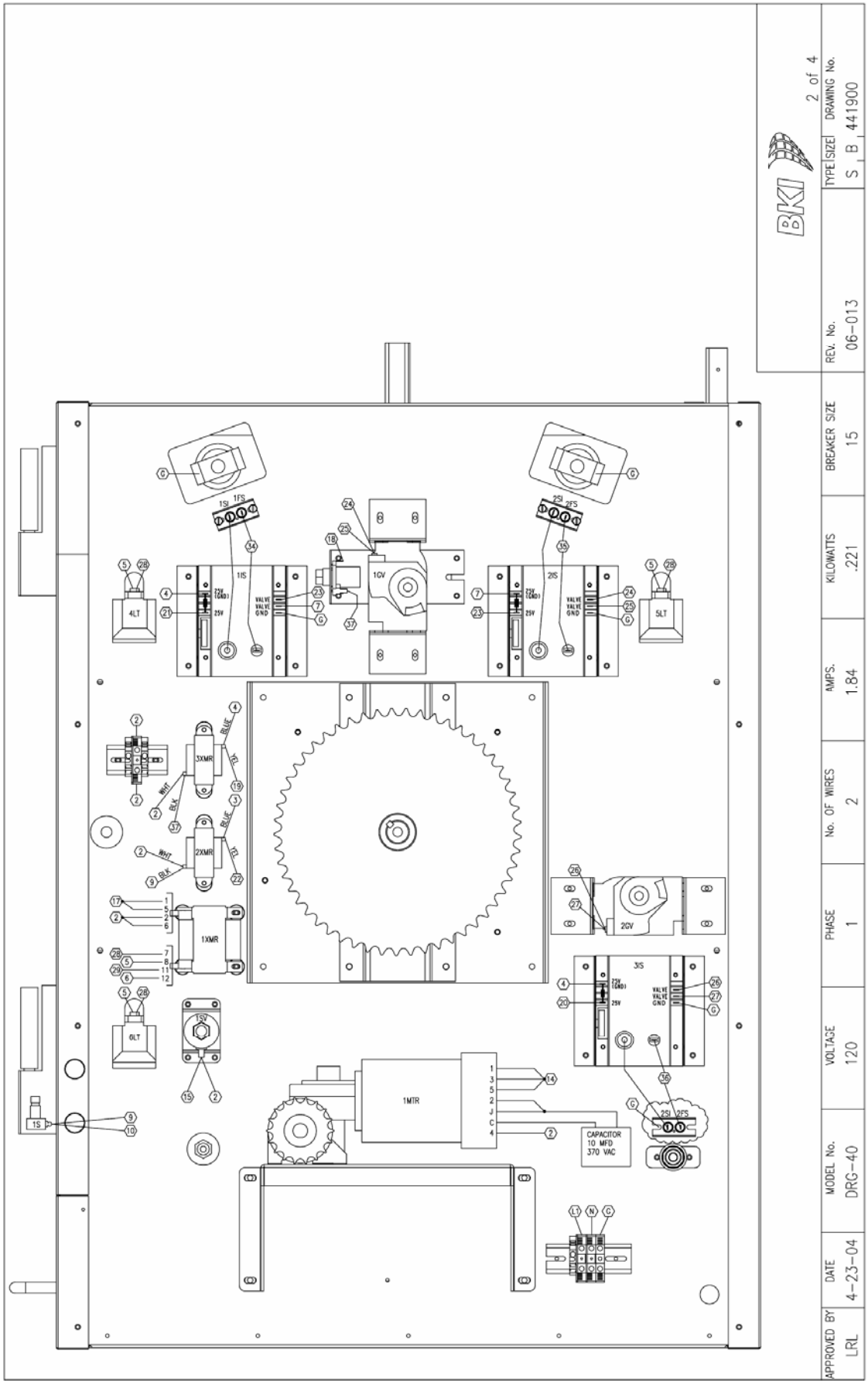
19

Wiring Diagrams

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DATE 4-23-04
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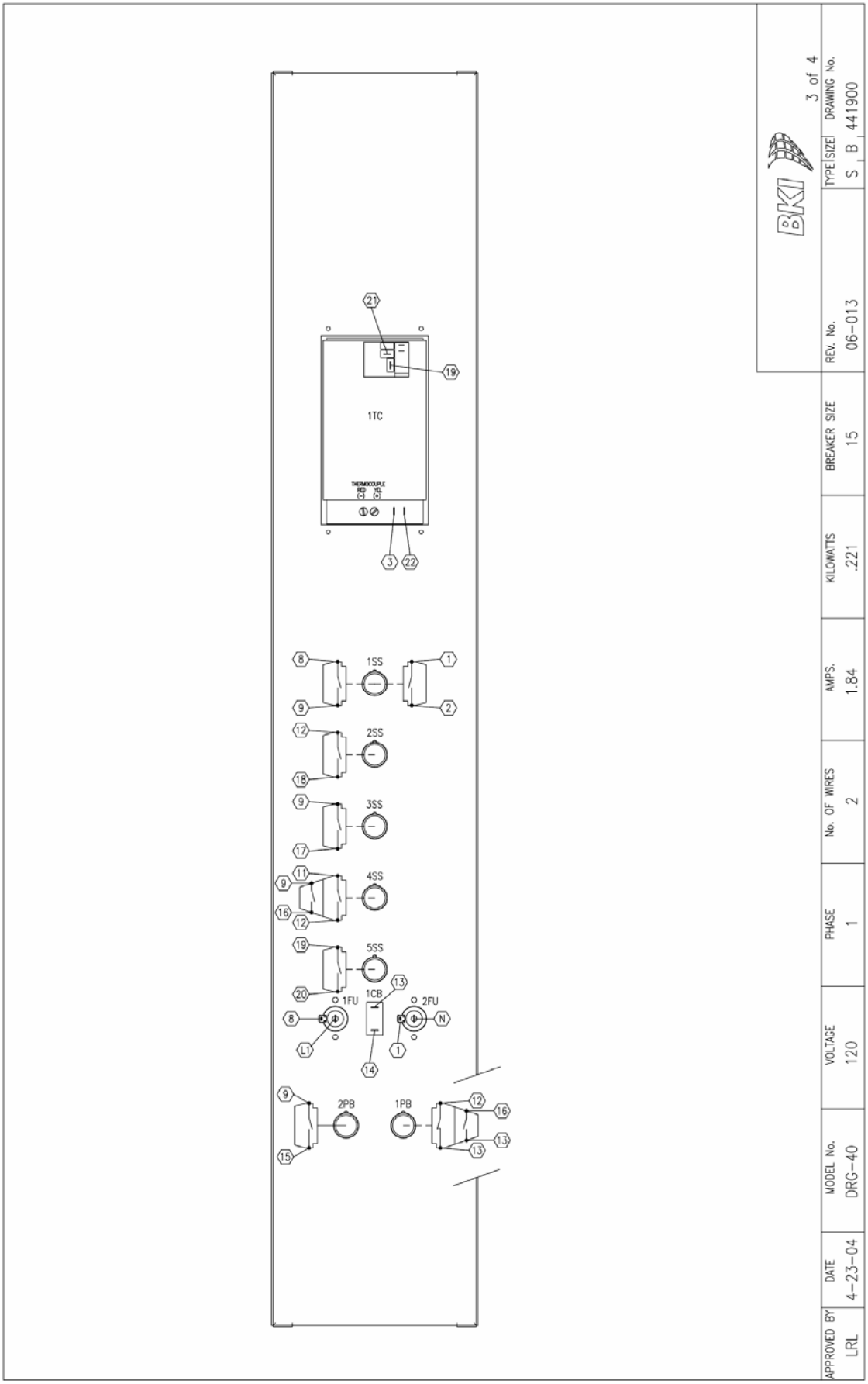
PHASE 1
No. OF WIRES 2
AMPS. 1.84
KILOWATTS .221
BREAKER SIZE 15
REV. No. 06-013
TYPE SIZE S B
DRAWING No. 441900
1S
1FS
1LS
1CV
2S
2FS
2LS
3S
3XMR
2XMR
1XMR
1TM
1MTR
2CV
4LT
5LT
6LT
CAPACITOR 10 MFD 370 VAC
L1 N G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APPROVED BY
LRL
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4-23-04
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DRG-40
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No. OF WIRES
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AMPS.
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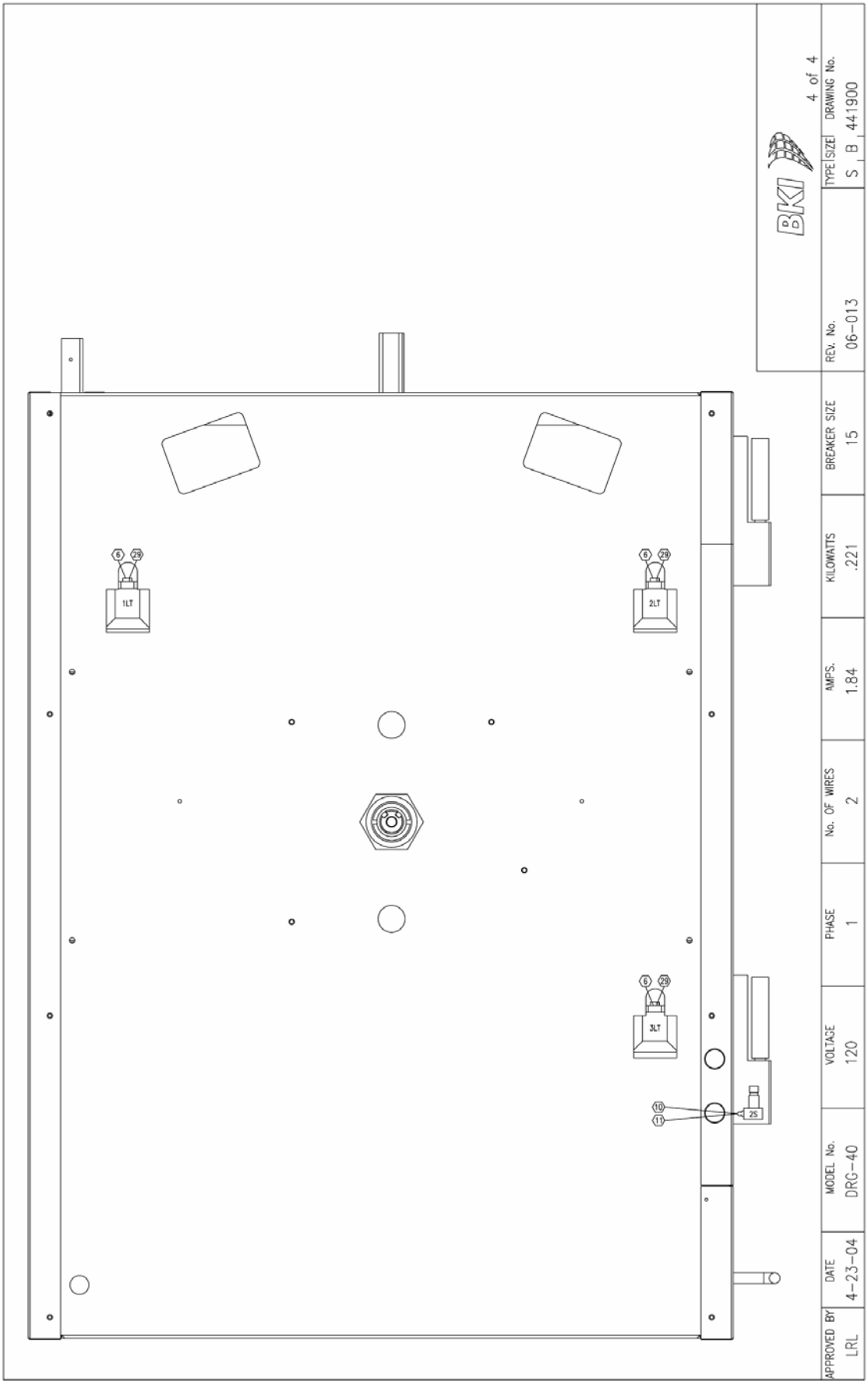
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DRAWING No.
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REV. No.
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KILOWATTS
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AMPS.
1.84
No. OF WIRES
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PHASE
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VOLTAGE
120
MODEL No.
DRG-40
DATE
4-23-04
APPROVED BY
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3LT
2S
6
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10
11

Appendix A
Gas Control Valve Instructions

Honeywell

VR8105, VR8205, and VR8305 Direct Ignition Combination Gas Controls

INSTALLATION INSTRUCTIONS

APPLICATION

These direct ignition gas controls are used in gas-fired appliances with up to 415 ft^3/hr. capacity at 1 in. wc pressure drop (8.5 m^3/hr at 0.25 kPa) on natural gas. They include a manual valve, two automatic operators and a pressure regulator.

These gas controls are available in a range of valve capacities, see Table 1. (Table 2 provides gas capacity conversion factors.) The suffix letter indicates temperature range and regulator type, see Table 3.

Table 1. Valve Capacity[a]

Model	Size Inlet-Outlet (in.)	AGA Certified Capacity for Natural Gas		AGA Certified Minimum Regulation for Natural Gas		AGA Certified Maximum Regulation for Natural Gas	
		ft^3/hr	m^3/hr	ft^3/hr	m^3/hr	ft^3/hr	m^3/hr
VR8105	1/2 x 1/2	85	2.3	10[d]	0.4	120	3.4
VR8205		150	4.2	20[e]	0.6	200	5.7
VR8305[b,c]		240	6.8	30[f]	0.8	340	9.6
VR8305[b,c]	1/2 x 3/4	270	7.6			370	10.5
VR8305[b,c]	3/4 x 3/4	300	8.5			415	11.8

[a] Capacity based on 1000 Btu/ft^3, 0.64 sp gr natural gas at 1 in. wc pressure drop (37.3 MJ/m^3, 0.64 sp gr natural gas at 0.25 kPa pressure drop).

[b] Capacity is reduced by 5 percent when using an outlet screen.

[c] Valves are guaranteed at only 77 percent of the rating.

[d] Minimum regulation for LP gas is 15,000 Btuh.

[e] Minimum regulation for LP gas is 40,000 Btuh.

[f] Minimum regulation for LP gas is 50,000 Btuh.

Table 2. Gas Capacity Conversion Factor.

Gas	Specific Gravity	Multiply Listed Capacity By
Manufactured	0.60	0.516
Mixed	0.70	0.765
Propane	1.53	1.62

Table 3. Model Number Suffix Letter Designation.

Model No. Suffix Letter	Ambient Temperature Range	Pressure Regulator Type
A	0°F to 175°F (-18°C to +79°C)	Standard
C		Step-opening
H		Slow Opening
K	-40°F to +175°F (-40°C to +79°C)	
M		Standard
P		Step-opening
Q		Two-stage
R		Convertible

CE

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SPECIFICATIONS

Body Pattern: Straight through; see Table 1 for inlet and outlet size.

Electrical Ratings:
Voltage and Frequency: 24 Vac, 60 Hz.
Current Draw: 0.5A with both operators energized.

Capacity: See Table 1.

Conversion:
Use conversion factors in Table 2 to convert capacities for other gases.

Regulation Range: See Table 1.

Natural-LP Gas Conversion Kits: See Table 4.

Pipe Adapters:
Angle and straight adapters available for 3/8-, 1/2- and 3/4-in. pipe. See Table 5. Flange kits include one flange with attached O-ring, four mounting screws, a 9/64 in. hex wrench and instructions.

Approvals:
American Gas Association Design Certificate: L2025006.
Canadian Gas Association Design Certificate: L2025006.
Australian Gas Association Design Certificate: 4214.
Approved for Delta C applications.
European Community (CE) Certificate: Pending.

PLANNING THE INSTALLATION

⚠ WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury, or death.

Follow these warnings exactly:
1. Plan the installation as outlined below.
2. Plan for frequent maintenance as described in the Maintenance section.

Heavy demands are made on the controls when direct ignition systems are used on central heating equipment in barns, greenhouses, and commercial properties and on heating appliances such as commercial cookers, agricultural equipment, industrial heating equipment and pool heaters.

Special steps may be required to prevent nuisance shutdowns and control failure due to frequent cycling, severe environmental conditions related to moisture, corrosive chemicals, dust or excessive heat. These applications require Honeywell Home and Building Control Engineering review; contact your Honeywell Sales Representative for assistance.

Review the following conditions that can apply to your specific installation and follow the precautions suggested.

Frequent Cycling

This control is designed for use on appliances that typically cycle three to four times an hour only during the heating season. In year-around applications with greater cycling rates, the control can wear out more quickly. Perform a monthly checkout.

Table 4. Natural-LP Gas Conversion Kits

Model No. Suffix Letter	Kit to Convert Natural Gas to LP	Kit to Convert LP to Natural Gas
H, K, M	393691	394588
P	Not field convertible.	Not field convertible.
Q	396021	396025
R	Not required, convertible valve.	Not required, convertible valve.

Table 5. Flange Adapter Part Numbers.

Inlet/Outlet Pipe Size (in. NPT)	Flange Type	Part No.[a,b]	
		Without Hex Wrench	With Hex Wrench
3/8	Straight	393690-1	393690-11
3/8	Elbow	393690-2	393690-12
1/2	Straight	393690-6	393690-16
1/2	Elbow	393690-3	393690-13
3/4	Straight	393690-4	393690-14
3/4	Elbow	393690-5	393690-15

[a] Flange kits include one flange, one O-ring and four mounting screws.
[b] Do not use flanges on control models with 3/4 in. inlet and 3/4 in. outlet. On models with 1/2 in. inlet and 3/4 in. outlet, use flanges only on the 1/2 in. inlet side.

Table 6 shows additional specifications for the CE-only models.

Table 6. VR8205A,H/VR8305A,H CE Models.

Specification	VR8205A,H (CE Model Only)	VR8305A,H (CE Model Only)
Main Valve Connection	1/2 in. ISO, 7/1 internal thread (BSP.PL).	1/2 in., 3/4 in. ISO, 7/1 internal thread (BSP.PL).
Ambient Temperature Range	-20°C to +70°C (-4°F to +158°F)	
Maximum Inlet Pressure	60 mbar (24 in. wc).	
Pressure Regulation	Servo regulator with adjustable outlet pressure; in accordance with EN 88 Class C. Natural gas: 9 mbar, typical; LP: 20 mbar, typical.	
Regulator Adjustment	For natural gas, 7.5 mbar to 12.5 mbar field adjustable. For LP gas, 20 mbar to 30 mbar field adjustable.	
Ground Terminal	6.3 mm	
Pressure Taps	9 mm OD	
Valve Classification	B+D	C+D

⚠ CAUTION

Equipment Damage Hazard.
Improper use can damage equipment.
Read the instructions before use. This control must be installed in accordance with the rules in force.

Water or Steam Cleaning

If a control gets wet, replace it. If the appliance is likely to be cleaned with water or steam, protect (cover) the control and wiring from water or steam flow. Mount the control high enough above the bottom of the cabinet so it does not get wet during normal cleaning procedures.

High Humidity or Dripping Water

Dripping water can cause the control to fail. Never install an appliance where water can drip on the control. In addition, high ambient humidity can cause the control to corrode and fail. If the appliance is in a humid atmosphere, make sure air circulation around the control is adequate to prevent condensation. Also, regularly check out the system.

Corrosive Chemicals

Corrosive chemicals can attack the control, eventually causing a failure. If chemicals are used for routine cleaning, avoid contact with the control. Where chemicals are suspended in air, as in some industrial or agricultural applications, protect the control with an enclosure.

Dust or Grease Accumulation

Heavy accumulations of dust or grease can cause the control to malfunction. Where dust or grease can be a problem, provide covers for the control to limit contamination.

Heat

Excessively high temperatures can damage the control. Make sure the maximum ambient temperature at the control does not exceed the rating of the control. If the appliance operates at very high temperatures, use insulation, shielding, and air circulation, as necessary, to protect the control. Proper insulation or shielding should be provided by the appliance manufacturer; verify proper air circulation is maintained when the appliance is installed.

INSTALLATION

When Installing this Product…

1. Read these instructions carefully. Failure to follow them could damage the product or cause a hazardous condition.
2. Check the ratings given in the instructions and on the product to make sure the product is suitable for your application.
3. Installer must be a trained, experienced service technician.
4. After installation is complete, check out product operation as provided in these instructions.

⚠ WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury or death.
Follow these warnings exactly:

1. Disconnect power supply before wiring to prevent electrical shock or equipment damage.
2. To avoid dangerous accumulation of fuel gas, turn off gas supply at the appliance service valve before starting installation, and perform Gas Leak Test after installation is complete.
3. Always install a sediment trap in gas supply line to prevent contamination of gas control.
4. Do not force the gas control knob. Use only your hand to turn the gas control knob. Never use any tools. If the gas control knob does not operate by hand, the gas control should be replaced by a qualified service technician. Force or attempted repair may result in fire or explosion.

⚠ CAUTION

Equipment Damage.
Can burn out valve coil terminals.
Never apply a jumper across (or short) the valve coil terminals, even temporarily.

Follow the appliance manufacturers instructions if available; otherwise use these instructions as a guide.

IMPORTANT

These gas controls are shipped with protective seals over the inlet and outlet tappings. Do not remove the seals until ready to install adapters or connect the piping.

Converting Gas Control from Natural Gas to LP Gas (or LP Gas to Natural Gas)

⚠ WARNING

Fire Or Explosion Hazard.
Can cause property damage, severe injury or death.

1. Do not attempt to convert step-opening models (suffix letter P).
2. Always change the main and pilot burner orifices when converting from natural to LP gas or from LP to natural gas. Carefully follow appliance manufacturer specifications and instructions to assure proper appliance conversion.
3. Gas controls are factory-set for natural (and manufactured) or LP gas. Do not attempt to use a gas control set for natural (manufactured) gas on LP gas, or a gas control set for LP gas on natural (manufactured) gas.

Controls with standard, slow-opening, and two-stage regulators (model numbers with suffix H, K, M, or Q) can be converted from one gas to the other with a conversion kit (ordered separately). See Table 4 for the correct conversion kit.

Convertible Pressure Regulators

Controls with suffix letter R are convertible pressure regulator models. They can be converted from natural gas to LP gas or from LP gas to natural gas without a conversion kit.

Before converting the control from one gas to another, check the control label and the appliance manufacturer's rating plate to determine if the pressure regulator setting (factory set) will meet the appliance manifold requirements after conversion.

NOTE: Convertible pressure regulator models (suffix letter R) do not have field-adjustable regulators.

If the factory pressure regulator setting meets the appliance manifold requirement, convert the control as follows:

1. Remove the pressure regulator cap, Fig. 1.
2. Invert the cap so that the letters appear that represent the gas type appropriate for the appliance. NAT for natural manufactured gas, LP for liquid petroleum gas.
3. Replace the cap and tighten firmly.

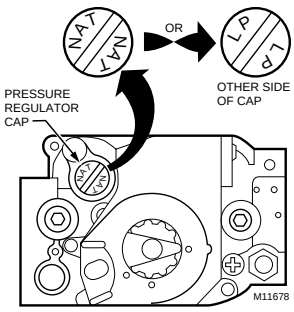


Fig. 1. Top view of convertible pressure regulator cap.

Install Adapters To Control

If adapters are being installed on the control, mount them as follows:

Flanges

1. Choose the appropriate flange for your application.
2. Remove the seal over the ignition system control inlet or outlet.
3. Make sure that the O-ring is fitted in the groove of the flange. If the O-ring is not attached or is missing, do not use the flange.
4. With the O-ring facing the gas control, align the screw holes on the control with the holes in the flange. Insert and tighten the screws provided with the flange. See Fig. 2. Tighten the screws to 25 inch-pounds of torque to provide a gas-tight seal.

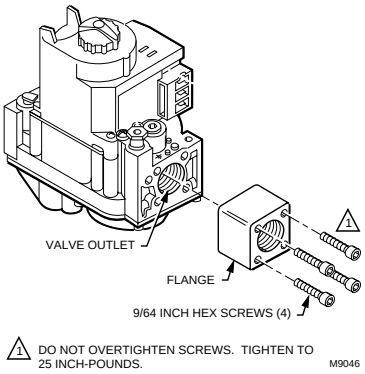


Fig. 2. Firmly fasten flange to valve, but do not overtighten screws.

Bushings

1. Remove the seal over the control inlet or outlet.
2. Apply a moderate amount of good quality pipe compound to the bushing, leaving two end threads bare. On an LP installation, use compound that is resistant to LP gas. Do not use Teflon tape.
3. Insert the bushing in the control and carefully thread the pipe into the bushing until tight.

Complete the instructions below for installing the piping, installing the control, connecting the pilot gas tubing and the wiring. Make sure the leak test you perform on the control after completing the installation includes leak testing the adapters and screws. If you use a wrench on the valve after the flanges are installed, use the wrench only on the flange, not on the control. See Fig. 5.

Location

The gas controls are mounted in the appliance vestibule on the gas manifold. If this is a replacement application, mount the gas control in the same location as the old control.

Locate the combination gas control where it cannot be affected by steam cleaning, high humidity, or dripping water, corrosive chemicals, dust or grease accumulation or excessive heat. To assure proper operation, follow these guidelines:

- Locate gas control in a well-ventilated area.
- Mount gas control high enough above cabinet bottom to avoid exposure to flooding or splashing water.
- Assure the ambient temperature does not exceed the ambient temperature ratings for each component.
- Cover gas control if appliance is cleaned with water, steam, or chemicals or to avoid dust and grease accumulation.
- Avoid locating gas control where exposure to corrosive chemical fumes or dripping water are likely.

Install Piping to Control

All piping must comply with local codes and ordinances or with the National Fuel Gas Code (ANSI Z223.1, NFPA No. 54), whichever applies. Tubing installation must comply with approved standards and practices.

1. Use new, properly reamed pipe that is free from chips. If tubing is used, make sure the ends are square, deburred and clean. All tubing bends must be smooth and without deformation.
2. Run pipe or tubing to the control. If tubing is used, obtain a tube-to-pipe coupling to connect the tubing to the control.
3. Install a sediment trap in the supply line to the control. See Fig. 3.

Install Control

1. Mounted 0 to 90 degrees in any direction, including vertically, from the upright position of the gas control knob.
2. Mount so the gas flow is in the direction of the arrow on the bottom of the control.
3. Thread the pipe the amount shown in Table 6 for insertion into control or adapters. Do not thread pipe too far. Valve distortion or malfunction can result if the pipe is inserted too deeply.

Table 7. NPT Pipe Thread Length (in.).

Pipe Size	Thread Pipe this Amount	Maximum Depth Pipe can be inserted into Control
3/8	9/16	3/8
1/2	3/4	1/2
3/4	13/16	3/4

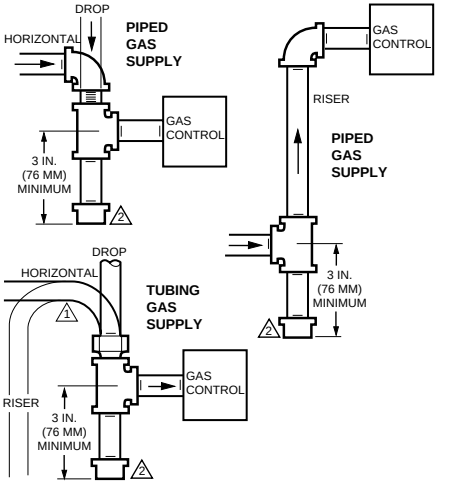

DROP
HORIZONTAL
PIPED GAS SUPPLY
GAS CONTROL
3 IN. (76 MM) MINIMUM
RISER
PIPED GAS SUPPLY
3 IN. (76 MM) MINIMUM
DROP
HORIZONTAL
TUBING GAS SUPPLY
GAS CONTROL
RISER
3 IN. (76 MM) MINIMUM
1 ALL BENDS IN METALLIC TUBING SHOULD BE SMOOTH.
2 CAUTION: SHUT OFF THE MAIN GAS SUPPLY BEFORE REMOVING END CAP TO PREVENT GAS FROM FILLING THE WORK AREA. TEST FOR GAS LEAKAGE WHEN INSTALLATION IS COMPLETE.
M3077

Fig. 3. Sediment trap installation.

4. Apply a moderate amount of good quality pipe compound (do not use Teflon tape) only to the pipe, leaving two end threads bare. On LP installations, use a compound resistant to LP gas. See Fig. 4.
5. Remove the seals over the control inlet and outlet if necessary.
6. Connect the pipe to the control inlet and outlet. Use a wrench on the square ends of the control. If a flange is used, place the wrench on the flange rather than on the control. Refer to Figs. 5 and 6.

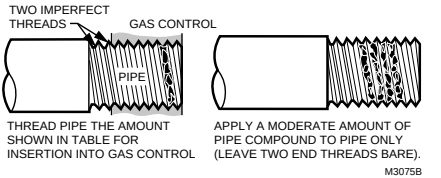

TWO IMPERFECT THREADS
GAS CONTROL
PIPE
THREAD PIPE THE AMOUNT SHOWN IN TABLE FOR INSERTION INTO GAS CONTROL
APPLY A MODERATE AMOUNT OF PIPE COMPOUND TO PIPE ONLY (LEAVE TWO END THREADS BARE).
M3075B

Fig. 4. Use moderate amount of pipe compound.

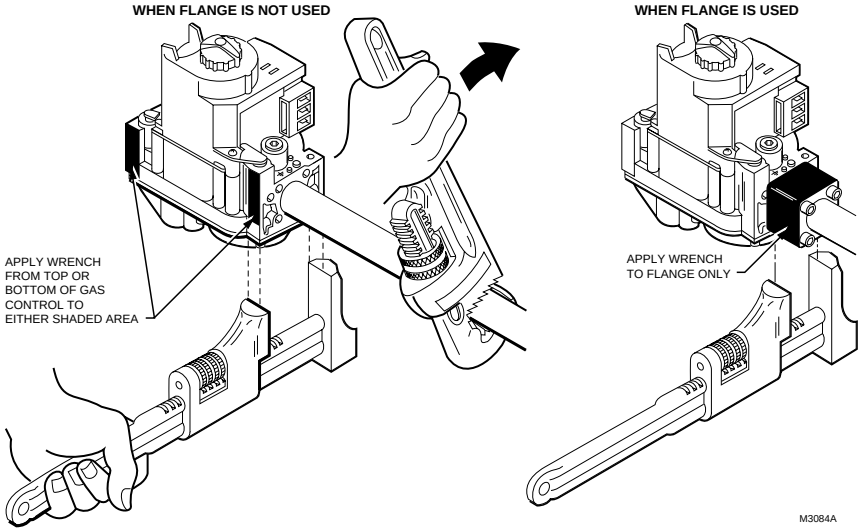

WHEN FLANGE IS NOT USED
WHEN FLANGE IS USED
APPLY WRENCH FROM TOP OR BOTTOM OF GAS CONTROL TO EITHER SHADED AREA
APPLY WRENCH TO FLANGE ONLY
M3084A

Fig. 5. Proper use of wrench on gas control with and without flanges.

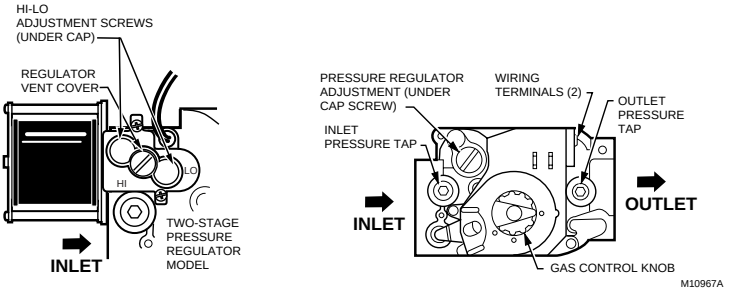


Fig. 6. Top view of gas control.

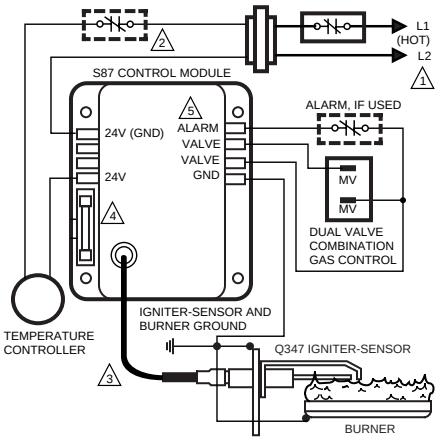
Wiring

Follow the wiring instructions furnished by the appliance manufacturer, if available, or use the general instructions provided below. When these instructions differ from the appliance manufacturer, follow the appliance manufacturer instructions.

All wiring must comply with applicable electrical codes and ordinances.

Disconnect power supply before making wiring connections to prevent electrical shock or equipment damage.

1. Check the power supply rating on the gas control and make sure it matches the available supply. Install a transformer and other controls as required.
2. Connect the control circuit to the gas control terminals. See Fig. 7 and 8.
3. Adjust thermostat heat anticipator to 0.50A rating stamped on valve operator.



1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED.

2 ALTERNATE LIMIT CONTROLLER LOCATION.

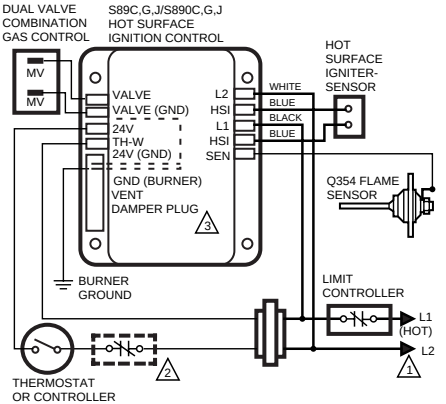
3 MAXIMUM IGNITER-SENSOR CABLE LENGTH: 3 ft. [.9 m] OR LESS.

4 3 A REPLACEABLE FUSE.

5 ALARM TERMINAL PROVIDED ON SOME MODELS.

M9043

Fig. 7. Typical wiring connections for 24 volt control in S87 Direct Ignition System.



1 POWER SUPPLY. PROVIDE DISCONNECT MEANS AND OVERLOAD PROTECTION AS REQUIRED. MAKE SURE L1 AND L2 ARE NOT REVERSED; THIS WOULD PREVENT FLAME DETECTION.

2 ALTERNATE LIMIT CONTROLLER LOCATION.

3 SEN TERMINAL AND Q354 FLAME SENSOR ON D MODELS ONLY.

M9047

Fig. 8. Typical wiring connections with 24 volt control in S89 Direct Ignition System.

STARTUP AND CHECKOUT

⚠ WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury or death.

1. Do not force the gas control knob on the appliance. Use only your hand to turn the gas control knob. Never use any tools.
2. If the knob does not operate by hand, the control should be replaced by a qualified service technician.

Gas Control Knob Settings

Gas control knob settings are as follows:

- OFF: Prevents pilot and main gas flow through the control.
- ON: Permits gas to flow into the control body. Under control of the thermostat and direct ignition module, gas can flow to the main burners.

NOTE: Controls are shipped with the gas control knob in the ON position.

Perform Gas Leak Test

⚠ WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury or death.

Perform Gas Leak Test every time work is done on a gas system.

IMPORTANT

Do not spray soap and water solution on the gas control. Do not use an excessive amount of soap and water solution to perform the gas leak test. These can damage the control.

Gas Leak Test

1. Paint pipe connections upstream of the gas control with rich soap and water solution. Bubbles indicate a gas leak.
2. If a leak is detected, tighten the pipe connections.
3. Light the main burner. Stand clear of the main burner while lighting to prevent injury caused from hidden leaks that could cause flashback in the appliance vestibule.
4. With the main burner in operation, paint the pipe joints (including adapters) and the control inlet and outlet with rich soap and water solution.
5. If another leak is detected, tighten the adapter screws, joints, and pipe connections.
6. Replace the part if a leak cannot be stopped.

Turn On System

Rotate the gas control knob counterclockwise ↶ to ON.

Turn On Main Burner

Follow appliance manufacturer instructions or turn thermostat up to call for heat.

Check and Adjust Gas Input and Burner Ignition

IMPORTANT

1. *Do not exceed input rating stamped on appliance nameplate, or manufacturer's recommended burner orifice pressure for size orifice(s) used. Make certain primary air supply to main burner is properly adjusted for complete combustion. Follow appliance manufacturer instructions.*
2. *IF CHECKING GAS INPUT BY CLOCKING GAS METER: Make certain there is no gas flow through the meter other than to the appliance being checked. Other appliances must remain off with the pilots extinguished (or deduct their consumption from the meter reading). Convert flow rate to Btuh as described in form 70-2602, Gas Controls Handbook, and compare to Btuh input rating on appliance nameplate.*
3. *IF CHECKING GAS INPUT WITH MANOMETER: Make sure the gas control is in the OFF position before removing outlet pressure tap plug to connect manometer (pressure gauge). Also move the gas control knob back to the OFF position when removing the gauge and replacing the plug. Before removing inlet pressure tap plug, shut off gas supply at the manual valve in the gas piping to the appliance or, for LP, at the tank. Also shut off gas supply before disconnecting manometer and replacing plug. Repeat Gas Leak Test at plug with main burner operating.*

NOTE: Check the inlet pressure before adjusting the pressure regulator.

Standard and Slow-Opening (H, K and M) Models

1. Carefully check the main burner lightoff. Make sure that the main burner lights smoothly and that all ports remain lit.
2. Check the full rate manifold pressure listed on the appliance nameplate. Gas control full rate outlet pressure should match this rating.
3. With main burner operating, check the control flow rate using the meter clocking method or check pressure using a manometer connected to the outlet pressure tap on the control. See Fig. 6.
4. If necessary, adjust the pressure regulator to match the appliance rating. See Tables 8 and 9 for factory-set nominal outlet pressure and adjustment range.
   a. Remove the pressure regulator adjustment cap screw.

Using a screwdriver, turn the inner adjustment screw (Fig. 6) clockwise ↷ to increase or counterclockwise ↶ to decrease the gas pressure to the burner.

   b. Always replace the cap screw and tighten firmly to prevent gas leakage.
5. If the desired outlet pressure or flow rate cannot be achieved by adjusting the gas control, check the gas control inlet pressure using a manometer at the inlet pressure tap of the gas control. If the inlet pressure is in the nominal range (see Tables 8 and 9), replace the gas control. Otherwise, take the necessary steps to provide proper gas pressure to the control.

NOTE: If the burner firing rate is above 150,000 Btuh on VR8305 models (see Table 1 for VR8305 capacities), it may not be possible to deliver the desired outlet pressure. This is an application issue, not a control failure. Take whatever steps are required to correct the situation.

Step-Opening (P) Models

Step-opening models require that you check and adjust the full-rate pressure first and then check the step pressure. The step pressure is not field adjustable.

1. Carefully check the main burner lightoff. Make sure that the main burner lights smoothly and that all ports remain lit.
2. Check the full rate manifold pressure listed on the appliance nameplate. Gas control full rate outlet pressure should match this rating.
3. With main burner operating, check the gas control flow rate using the meter clocking method or check pressure using a manometer connected to the outlet pressure tap on the gas control. See Fig. 6.
4. If necessary, adjust the pressure regulator to match the appliance rating. See Tables 8 and 9 for factory-set nominal outlet pressure and adjustment range.
   a. Remove the pressure regulator adjustment cap screw.

Using a screwdriver, turn the inner adjustment screw (Fig. 6) clockwise ↷ to increase or counterclockwise ↶ to decrease the gas pressure to the burner.

   b. Always replace the cap screw and tighten firmly to prevent gas leakage.
5. If the desired outlet pressure or flow rate cannot be achieved by adjusting the gas control, check the gas control inlet pressure using a manometer at the inlet pressure tap of the control. If the inlet pressure is in the nominal range (see Tables 8 and 9), replace the control. Otherwise, take the necessary steps to provide proper gas pressure to the control.
6. Carefully check the burner lightoff at step pressure. Make sure the burner lights smoothly and without flashback to the orifice. Make sure all ports remain lit. Cycle the burner several times, allowing at least 60 seconds between cycles for the regulator to resume the step function. Repeat after allowing the burner to cool. Readjust the full rate outlet pressure, if necessary, to improve lightoff characteristics.

Two-Stage (Q) Models

Two-stage models require that you check and adjust both high and low pressure regulator settings. Two-stage appliance operating sequences vary. Consult the appliance manufacturer instructions for the specific operating sequence and regulator adjustment procedure for the appliance in which the control is installed.

1. Set appliance to operate on high.
2. Carefully check the main burner lightoff. Make sure that the main burner lights smoothly and that all ports remain lit.
3. Check the full rate (high) manifold pressure listed on the appliance nameplate for high pressure. The gas control full rate outlet pressure should match this rating.

4. With main burner operating, check the gas control flow rate using the meter clocking method or check pressure using a manometer connected to the outlet pressure tap on the gas control. See Fig. 6.
5. If necessary, adjust the high pressure regulator to match the appliance rating. See Tables 8 and 9 for factory-set nominal outlet pressure and adjustment range.
   a. Remove the pressure regulator adjustment cap (Fig. 6).

Using a screwdriver, turn the inner adjustment screw for HI pressure clockwise ↷ to increase or counterclockwise ↶ to decrease the gas pressure to the burner.

6. After high pressure has been checked, check low pressure regulation. Two-stage appliance operating sequences vary. Consult the appliance manufacturers instructions for the specific operating sequence and regulator adjustment procedure for the appliance in which the control is installed and for instructions on how to prevent the control from moving to high stage while checking the low pressure regulator setting.
7. Check the low rate manifold pressure listed on the appliance nameplate. Gas control low rate outlet pressure should match this rating.
8. With main burner operating, check the gas control flow rate as before (using the meter clocking method or check pressure using a manometer connected to the outlet pressure tap on the control).
9. If necessary, adjust the low pressure regulator to match the appliance rating. See Tables 8 and 9 for factory-set nominal outlet pressure and adjustment range.
   a. Remove the pressure regulator adjustment cap (Fig. 6).

Using a screwdriver, turn the inner adjustment screw for LO pressure clockwise ↷ to increase or counterclockwise ↶ to decrease the gas pressure to the burner.

10. Once high and low pressure have been checked and adjusted, replace pressure regulator adjustment cap. If the desired outlet pressure or flow rate cannot be achieved by adjusting the gas control, check the control inlet pressure using a manometer at the inlet pressure tap of the control. If the inlet pressure is in the nominal range (see Tables 8 and 9), replace the gas control. Otherwise, take the necessary steps to provide proper gas pressure to the control.

Check Safety Lockout (Slow-Opening Controls Only)

1. With the system power off and the thermostat set to call for heat, manually shut off the gas supply.
2. Energize ignition control and start timing safety lockout time. When spark ignition terminates, stop timing.
   When using the VR8105H, VR8205H and VR8305H step-opening control, the specified ignition control safety lockout time must exceed 8.5 seconds for the system to function properly.
3. After spark cutoff, manually reopen the gas control knob. No gas should flow to the main burner.
4. Reset the system by adjusting the thermostat below room temperature, wait 30 seconds, and then move the thermostat setting up to call for heat. Normal ignition should occur.

Table 8. Pressure Regulator Specification Pressures (in. wc).

Model Type	Type of Gas	Nominal Inlet Pressure Range	Factory Set Nominal Outlet Pressure		Setting Range	
			Step	Full Rate	Step	Full Rate
Standard, Slow	NAT	5.0-7.0	—	3.5	—	3.0-5.0
	LP	12.0-14.0	—	10.0	—	8.0-12.0
Step	NAT	5.0-7.0	0.9	3.5	None	0.7-1.7
	LP	12.0-14.0	2.2	10.0	None	1.4-5.5
Two-stage	NAT	5.0-7.0	—	1.7 Low 3.5 High	—	0.9-3.0 Low[a] 3.0-5.0 High
	LP	12.0-14.0	—	4.9 Low 10.0 High	—	3.5-5.5 Low 8.0-11.0 High

[a] Low Fire setting range for VR8305Q 1/2 in. by 1/2 in. and 1/2 in. by 3/4 in. is 1.5 to 3.0 in. wc.

Table 9. Pressure Regulator Specification Pressures (kPa).

Model Type	Type of Gas	Nominal Inlet Pressure Range	Factory Set Nominal Outlet Pressure		Setting Range	
			Step	Full Rate	Step	Full Rate
Standard, Slow	NAT	1.2-1.7	—	0.9	—	0.7-1.2
	LP	2.9-3.9	—	2.5	—	2.0-3.0
Step	NAT	1.2-1.7	0.2	0.9	None	0.17-0.48
	LP	2.9-3.9	0.5	2.5	None	1.4-1.37
Two-stage	NAT	1.2-1.7	—	0.48 Low 0.9 High	—	0.22-0.75 Low[a] 0.75-1.2 High
	LP	2.9-3.9	—	1.2 Low 2.5 High	—	0.9-1.4 Low 2.0-2.5 High

[a] Low Fire setting range for VR8305Q 1/2 in. by 1/2 in. and 1/2 in. by 3/4 in. is 0.37 to 0.75 kPa.

Check Safety Shutdown Performance

WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury or death.
Perform the safety shutdown test any time work is done on a gas system.

NOTE: Read steps 1 through 7 before starting, and compare to the safety shutdown or safety lockout tests recommended for the direct ignition (DI) module. Where different, use the procedure recommended for the module.

1. Turn off gas supply.
2. Set thermostat or controller above room temperature to call for heat.
3. Watch for ignition spark or for glow at hot surface igniter either immediately or following prepurge. See DI module specifications.
4. Time the length of spark operation. See the DI module specifications.
5. After the module locks out, open the manual gas cock and make sure no gas is flowing to the main burner.
6. Set the thermostat below room temperature and wait one minute.
7. Operate system through one complete cycle to make sure all controls operate properly.

MAINTENANCE

WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury, or death.
Do not disassembly the gas control; it contains no replaceable components. Attempted disassembly, repair, or cleaning can damage the control, resulting in gas leakage.

Regular preventive maintenance is important in applications in the commercial cooking and agricultural and industrial industries that place a heavy load on system controls because:

- In many such applications, particularly commercial cooking, the equipment operates 100,000 to 200,000 cycles per year. Such heavy cycling can wear out the gas control in one to two years.
- Exposure to water, dirt, chemicals and heat can damage the gas control and shut down the control system.

The maintenance program should include regular checkout of the control as outlined in the Startup and Checkout section, and the control system as described in the appliance manufacturer literature.

Maintenance frequency must be determined individually for each application. Some considerations are:

- Cycling frequency. Appliances that may cycle 20,000 times annually should be checked monthly.
- Intermittent use. Appliances that are used seasonally should be checked before shutdown and again before the next use.
- Consequence of unexpected shutdown. Where the cost of an unexpected shutdown would be high, the system should be checked more often.
- Dusty, wet, or corrosive environments. Since these environments can cause the gas control to deteriorate more rapidly, the system should be checked more often.

The system should be replaced if:

- It does not perform properly on checkout or troubleshooting.
- The gas control is likely to have operated for more than 200,000 cycles.
- The control is wet or looks as if it has been wet.

SERVICE

WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury or death.
Do not disassemble the gas control; it contains no replaceable components. Attempted disassembly, repair, or cleaning can damage the control, resulting in gas leakage.

⚠ CAUTION

Equipment Damage.
Can burn out valve coil terminals.
Never apply a jumper across (or short) the valve coil terminals, even temporarily.

After servicing, verify proper system operation.

If Main Burner Does Not Come On With Call For Heat

1. Confirm the gas control knob is in the ON position.
2. Adjust thermostat several degrees above room temperature.
3. Using ac voltmeter, measure across MV terminals at gas control.
4. If voltage is incorrect or not present, check control circuit for proper operation.
5. If proper voltage is present, replace gas control.

INSTRUCTIONS TO THE HOME-OWNER

⚠ WARNING

Fire or Explosion Hazard.
Can cause property damage, severe injury, or death.
Follow these warnings exactly:

1. Before lighting, smell around the appliance for gas. Be sure to smell next to the floor because LP gas is heavier than air. If you smell gas:
   (a) •Turn off the gas supply at the appliance service valve. On LP gas systems, turn off the gas supply at the gas tank.
   (b) •Do not light any appliances in the house.
   (c) •Do not touch electrical switches or use the phone.
   (d) •Leave the building and use a neighbor's phone to call your gas supplier.
   (e) •If you cannot reach your gas supplier, call the fire department.
2. Replace the gas control in the event of any physical damage, tampering, bent terminals, missing or broken parts, stripped threads, or evidence of exposure to heat.

IMPORTANT

Follow the operating instructions provided by the heating appliance manufacturer. The information below describes a typical control application, but the specific controls used and the procedures outlined in your appliance manufacturer instructions can differ, requiring special instructions.

To Turn ON Appliance

STOP: Read the Warnings Above Before Proceeding

1. The lighting sequence on this appliance is automatic; *do not attempt to manually light the main burner.*
2. If the furnace does not come on when the thermostat is set several degrees above room temperature, set the thermostat to its lowest setting to reset the safety control.
3. Remove the burner access panel if provided on your appliance.

Turn the gas control knob clockwise ↷ to OFF.

4. Wait five minutes to allow any gas in the combustion chamber to vent. Then if you smell gas, STOP! Follow Step 1 in the Warning above. If you do not smell gas, continue with the next step.

If you do not smell gas, turn knob on gas control counterclockwise ↶ to ON.

5. Replace the burner access panel.
6. Reset the thermostat to the desired temperature.
7. If the appliance does not turn on, turn the gas control knob to OFF and contact a qualified service technician for assistance.

Turning Off the Appliance

Vacation Shutdown

Set the thermostat to the desired room temperature while you are away.

Complete Shutdown

Turn off power to the appliance. Turn off the gas supply to the appliance. Turn gas control knob clockwise ↷ to OFF. Appliance will completely shut off. Follow the procedure in the Instructions to the Homeowner section above to resume normal operation.

Honeywell

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